Piezoelectric Metamaterial Blood Pressure Sensor

by

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Piezoelectric Metamaterial Blood Pressure Sensor

Koç University

Graduate School of Sciences and Engineering

This is to certify that I have examined this copy of a master's thesis by

Abdollah Ahmadpour

and have found that it is complete and satisfactory in all respects,

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Dedicated to my loving and supporting parents; Mohammad Saeed and Khaledeh!

ABSTRACT

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Continuous blood pressure monitoring allows for detecting the early onset of cardiovascular disease and assessing personal health status. Conventional piezoelectric blood pressure monitoring techniques have the ability to sense biosignals due to their good dynamic responses but have significant drawbacks in terms of power consumption, which limits the operation of blood pressure sensors. Although piezoelectric materials can be used to enhance the self-powered blood pressure sensor responses, the structure of the piezoelectric element can be modified to achieve a higher output voltage. Here, a structural study on piezoelectric metamaterials in blood pressure sensors is demonstrated, and output voltages are computed and compared to other architectures. Next, a Bayesian optimization framework is defined to get the optimal design according to the metamaterial design space. Machine learning algorithms were used for applying regression models to a simulated dataset, and a 2D map was visualized for key parameters. Finally, a time-dependent blood pressure was applied to the inner surface of an artery vessel inside a 3D tissue skin model to compare the output voltage for different metamaterials. Results revealed that all types of metamaterials can generate a higher electric potential in comparison to normal square-shaped piezoelectric elements. Bayesian optimization showed that honeycomb metamaterials had the optimal performance in generating output voltage, which was validated according to regression model analysis resulting from machine learning algorithms. The simulation of time-dependent blood pressure in a 3D skin tissue model revealed that the design suggested by the Bayesian optimization process can generate an electric potential more than two times greater than that of a conventional square-shaped piezoelectric element.

ÖZETÇE

Piezoelectric Metamaterial Blood Pressure Sensor

Abdollah Ahmadpour

Makine Mühendisliği, Yüksek Lisans

08 Eylül 2023

Sürekli kan basıncı izlemesi, kardiyovasküler hastalığın erken başlangıcının tespit edilmesine ve kişisel sağlık durumunun değerlendirilmesine olanak tanır. Geleneksel piezoelektrik kan basıncı izleme teknikleri, iyi dinamik tepkileri nedeniyle biyosinyalleri algılama yeteneğine sahip olmasına rağmen, güç tüketimi konusunda ciddi dezavantajlara sahiptir, bu da kan basıncı sensörlerinin işleyişini sınırlar. Piezoelektrik malzemeler, öz-enerjili kan basıncı sensör tepkilerini artırmak için kullanılabilese de, piezoelektrik elemanın yapısı daha yüksek bir çıkış gerilimi elde etmek için değiştirilebilir. Burada, kan basıncı sensörlerinde piezoelektrik meta malzemeler üzerine bir yapısal çalışma sunulmakta ve çıkış gerilimleri hesaplanarak diğer mimarilerle karşılaştırılmaktadır. Ardından, metamalzeme tasarım alanına göre optimal tasarım elde etmek için bir Bayesyen optimizasyon çerçevesi tanımlanmıştır. Makine öğrenimi algoritmaları, bir simüle edilmiş veri kümesine regresyon modelleri uygulamak için kullanılmış ve temel parametreler için 2D harita görselleştirilmiştir. Son olarak, 3D dokusal deri modeli içinde arter damarının iç yüzeyine zamanla değişen bir kan basıncı uygulanmış ve farklı metamalzemeler için çıkış gerilimi karşılaştırılmıştır. Sonuçlar, tüm metamalzeme türlerinin normal kare şekilli piezoelektrik elemanlara kıyasla daha yüksek bir elektriksel potansiyel üretebildiğini ortaya koymuştur. Bayesyen optimizasyon, petek hücreli metamalzemelerin çıkış gerilimi üretmede en iyi performansa sahip olduğunu göstermiş, bunun makine öğrenimi algoritmalarıyla elde edilen regresyon modeli analizine göre doğrulanmıştır. 3D deri dokusu modelinde zamanla değişen kan basıncının simülasyonu, Bayesyen optimizasyon süreci tarafından önerilen tasarımın, geleneksel kare şekilli piezoelektrik elemanınkinden iki kat daha büyük bir elektriksel potansiyel üretebildiğini ortaya koymuştur.

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ABBREVIATIONS

BP	Blood Pressure
MEMS	Micro-Electro-Mechanical System
ML	Machine Learning
FEM	Finite Element Method
PVDF	Polyvinylidene Fluoride
FEA	Finite Element Analysis
SVR	Support Vector Regression
RBF	Radial Basis Function
FDM	Fused Deposition Modeling
EPAM	Electric Poling-assisted Additive Manufacturing
LCD	Liquid Crystal Display
ADC	Analog-to-Digital Converter

Chapter 1:
INTRODUCTION

Over a billion individuals worldwide are affected by hypertension, which is a major risk factor for cardiovascular disease that is not successfully controlled at the global level (Chen et al., 2021). It also contributes to stroke, myocardial infarction, cardiac failure, dementia, renal failure, blindness, chronic kidney disease, and even sudden death (Chen et al., 2021; Heidenreich et al., 2011; Organization, 2014; Yi et al., 2022). An important method required to initially diagnose hypertension is blood pressure (BP) measurement (Tan et al., 2022). Clinical diagnosis commonly uses the auscultatory and oscillometric methods for BP measurements obtained by a cuff sensor. These methods are inconvenient since they require frequent cuff inflations and only provide one-off data as opposed to continuous BP monitoring (Wang & Lin, 2020). Arterial cannula is an invasive method that enables precisely measuring BP in a continuous manner and involves inserting a catheter into a blood vessel that is associated with an infection risk (Kitterman et al., 1970). Non-invasive continuous BP detection that is based primarily on arterial pulse monitoring remains an urgent medical need (Wang & Lin, 2020). Real-time biomedical monitoring technologies, especially wearable micro-electromechanical systems (MEMS)-based arterial pulse monitoring, have enabled the measurement of a wide range of physiological signals (Park et al., 2017). Piezoelectric sensors for BP monitoring have high fidelity and good dynamic response characteristics (Cheng et al., 2016; Dagdeviren et al., 2014; Guo et al., 2018; Panwar et al., 2017; Wang & Lin, 2020; Wang et al., 2011; Yi et al., 2022; Zheng et al., 2017). The first use of a piezoelectric crystal microphone for arterial pulse wave detection dates back to the 1940s (Miller & White, 1941). Although previous studies have focused on the effect of piezoelectric element thickness and surface area on its response in BP monitoring (Panwar et al., 2017; Ramsay & Clark, 2001; Sharma et al., 2012; Yi et al., 2022), the impact of structure and architecture on piezoelectric response has not yet been investigated.

Metamaterials are artificially made structures or composites that have remarkable physical properties not seen in conventional materials (Fan et al., 2021). Re-entrant metamaterial architectures have useful biomedical applications due to their unique property called negative Poisson’s ratio, in which they can contract (expand) laterally under longitudinal compression (stretching) (Chen et al., 2022). The potential effect of an auxetic (re-entrant) metamaterial substrate on a piezoelectric element's output response has been reported in biomedical pressure sensors (Farhangdoust et al., 2020; Farhangdoust et al., 2022) and piezoelectric cantilever beam energy harvesters (Chen et al., 2022). However, according to advances in 3D printing technology of piezoelectric materials (Bodkhe & Ermanni, 2019; Cholleti, 2018; Kim et al., 2014), the piezoelectric element can be fabricated in various architectures beyond regular disc, sheet, and film shapes to overcome the wastage of materials in cutting and punching processes while increasing the maximum strain of the system (Bodkhe & Ermanni, 2019). Furthermore, the thickness range of piezoelectric material for 3D printing is on the order of hundreds of micrometers (μm) to several millimeters (Zeng et al., 2021), which makes them suitable to be fabricated in complex structures. Thus, metamaterials can potentially be designed for the piezoelectric element of MEMS devices to enhance the output response in BP monitoring systems.

Conventional design strategies for metamaterial structures often rely on manual processes, which can be practical but are not guaranteed to provide the optimal performance in all cases (Bonfanti et al., 2020). Machine learning (ML) is capable of outperforming manual processes, especially in metamaterial design (Bessa et al., 2019). Using algorithms that iteratively learn from data, these methods allow computers to discover hidden insights without having to be explicitly programmed where to search (Liu et al., 2017), which can be efficiently used in metamaterial parameter estimation. Regression models represent a type of ML technique that offers a continuous range of values that can be implemented to make frequent predictions (Greener et al., 2022). Piezoelectric metamaterial BP sensors can be designed to their best potential using computational techniques such as Bayesian optimization. This method, which has demonstrated successful performance in previous studies (Bessa et al., 2019; Son et al., 2021), is appropriate for optimizing a function that is time consuming to evaluate or that has a large number of local minima.

Here, a definition of the parameter design of a piezoelectric BP sensor was created to set up a finite element method (FEM) using COMSOL Multiphysics (Figure 1.1AB). This allowed for simulating the effect of piezoelectric structure on the output electric voltage of a BP sensor when placed on a 3D skin tissue model with an artery inside. Several metamaterial structures, including honeycomb and re-entrant metamaterials, were compared to a normal square-shaped piezoelectric element in terms of generating electric potential. Next, a Bayesian optimization method was used to achieve the optimal design of the proposed piezoelectric metamaterial BP sensor (Figure 1.1C). Afterwards, 4,000 data points were prepared from simulation, which could relate every set of parameter design to its computed output voltage (Figure 1.1D). The dataset was used to train regression models using machine learning algorithms to reveal the effect of design parameters on the output voltage. The regression model was also used for the validation of optimization results. Then, a 2D map for design parameters according to the optimal regression model performance was visualized. Finally, a time-dependent BP simulation of the obtained structures was developed, and different structures were compared according to their highest calculated output voltage (Figure 1.1E).

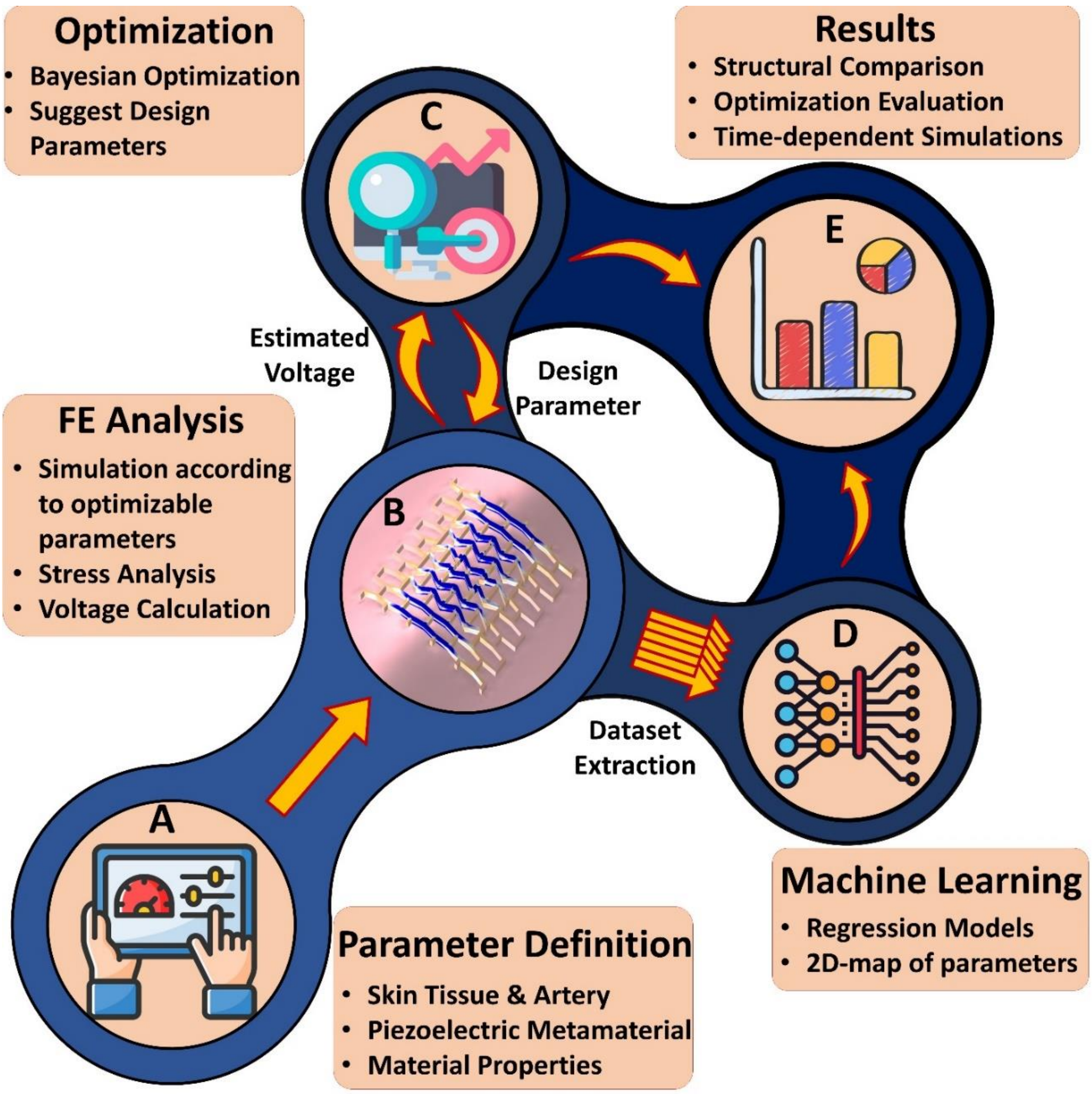

Figure 1.1 Workflow of the study. (A) Parameter definition: geometrical parameters that were used in modeling the piezoelectric metamaterial BP sensor, skin, and artery vessel as well as material properties for each element. (B) Finite Element Analysis: the numerical simulation had been carried out using COMSOL Multiphysics software to calculate the output electric potential of the piezoelectric metamaterial sensor considering the boundary conditions, input BP, and skin tissue properties. (C) Optimization: in order to receive the maximum electric potential from the piezoelectric metamaterial element, which was defined as an objective function, a Bayesian optimization framework has been used to optimize the geometrical parameters of the metastructure. (D) Machine Learning: as a parameter estimation technique, different regression models were applied to the dataset derived from simulation results to create a 2D map for interested parameters that showed the relationship between parameters and electric potential generation. E) Results: simulations of the piezoelectric metamaterial BP sensor in the time domain and a comparison between the optimal design and other structures in terms of generating output voltage.

Chapter 2:
METHODS

2.1 *Geometries & Material Properties*

2.1.1 Piezoelectric Metamaterial

The proposed piezoelectric metamaterial was a 2D lattice structure formed by 5×5 square unit cells (Figure 2.1A). Each unit cell was designed according to the angle of the unit cell (θ) to be able to form a honeycomb structure or a re-entrant structure for positive or negative values of θ, respectively (Figure 2.1B). Each unit cell had a square length (l) of 2 mm to form a total square length (L) of 1 cm for the piezoelectric element. To obtain a solid model of the proposed design, the structure was expanded with a thickness (t) for in-plane and out-of-plane directions that was fixed at 200 μm. The thickness of the structure was selected according to the acceptable range of thickness reported in recent piezoelectric 3D printing studies, which was in a range from 100 μm to several millimeters (Zeng et al., 2021). θ range was specified between -30° and 30°, which was defined as a controllable parameter. According to constant parameters of piezoelectric metamaterial, θ more than 30° or less than -30° leads to a closed unit cell, which was not desirable for the design. For any combination of θ for all unit cells, the re-entrant or honeycomb structure of each unit cell remained within a square l of 2 mm.

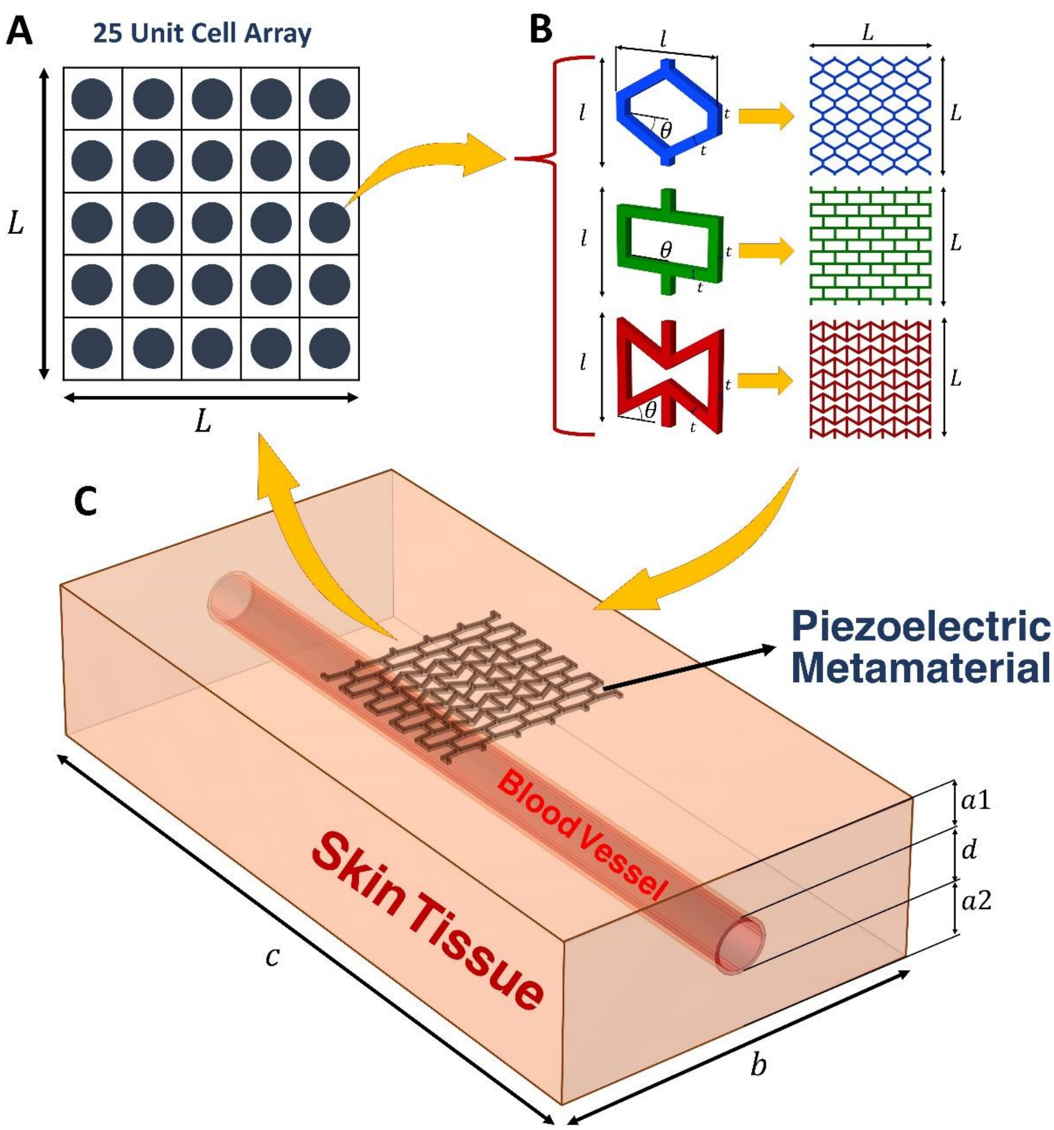

Figure 2.1 3D blood pressure piezoelectric metamaterial sensor simulation model. (A) The proposed piezoelectric metamaterial consisted of a 5×5 unit cells in a square shape with a length of L. (B) Each unit cell was defined in such a way that its total length fit in a square with the length of l, the in-plane and out-of-plane thickness of unit cells determined by t, and the θ is the angle of unit cell, which was a variable parameter that described the type of unit cell that led to the definition of the whole structure when the same θ was used for all unit cells: honeycomb, brick, and re-entrant. (C) The piezoelectric metamaterial sensor model was placed on skin tissue modeled with width of b and length of c. A blood vessel with d diameter was placed at a distance from the skin's surface described as a1 and a2 parameter represented the skin thickness below the blood vessel. The BP was applied to the inner surface of the blood vessel while the left and right sides of the skin model were fixed and other sides of the skin were free to be deformed.

The mentioned structures utilized a material with inherent piezoelectric properties. There are two types of the piezoelectric effect: (i) the direct effect, which describes how a material can convert mechanical strain into an electrical charge, and (ii) the inverse effect, which describes how a material can change an applied electrical potential into mechanical strain energy (Sodano et al., 2004). Polyvinylidene fluoride (PVDF) is one of the piezoelectric materials being used for sensors due to its high remanent polarization (Kawai, 1969; Kim et al., 2017). Despite having less piezoelectricity than piezoelectric ceramics, PVDF outperforms them because of its inherent benefits of biocompatibility, toughness, flexibility, formability, and higher fatigue life (Bodkhe et al., 2017), as well as its printability, which makes it a suitable polymer for piezoelectric metamaterials. In this study, PVDF material from the COMSOL Multiphysics' material library was used to calculate the direct piezoelectric effect of the proposed BP sensor according to its material properties. The constant geometry parameters of the proposed piezoelectric metamaterial structure and the material properties of PVDF are listed in Table 2.1.

Table 2.1 Constant Geometrical Parameters and Material Properties of PVDF.

Geometrical Parameters	**Value**
Total Square Length of Piezoelectric Element (L)	10 [mm]
Square Length of each Unit Cell (l)	2 [mm]
Thickness (t)	0.2 [mm]
Number of Unit Cells	25
Property	**Value**
Density (ρ_{PVDF})	1780 [Kg/m^3]
Compliance Matrix ($S_{11}^E, S_{22}^E, S_{33}^E$)	3.781, 3.78, 10.92 [$\times\ 10^{-10}\ 1/Pa$]
Coupling Matrix (d_{31}, d_{32}, d_{33})	13.58, 1.47, -33.8 [$\times\ 10^{-12}\ C/N$]
Relative Permittivity ($\varepsilon_{11}, \varepsilon_{22}, \varepsilon_{33}$)	7.4, 9.3, 7.4

2.1.2 Skin Tissue & Radial Artery Blood Vessel

Skin is a nonlinear viscoelastic material, and its mechanical properties are complicated; hence, a simplified elastic model of the skin was proposed according to the previous reports (Pawlaczyk et al., 2013). The width and length of the skin model were

20×40 mm, and the depth of the skin was 8.53 mm, which were selected according to the blood vessel dimensions and the distance between the blood vessel and the skin surface (Figure 2.1C). Since Young's modulus of the skin layer in suction tests was reported to be between 0.05 MPa and 0.15 MPa (Agache et al., 1980; Diridollou et al., 2000; Hendriks et al., 2003; Pailler-Mattei et al., 2008; Pawlaczyk et al., 2013)**,** an average of 0.1 MPa was set for Young's modulus. For density and Poisson's ratio of the skin layer, 1109 Kg.m^{-3} and 0.48 were used, respectively, as defined in COMSOL Multiphysics' material library for skin. The radial artery had been reported to have a 2.5-mm inner diameter and 0.2-mm wall thickness (Boonya-Ananta et al., 2021; Khamdaeng et al., 2012; Kim et al., 2015; Lee et al., 2017). The vessel wall mass density, Poisson's ratio, and Young's modulus were set to 1160 Kg.m^{-3}, 0.49, and 0.70 MPa, respectively (Boonya-Ananta et al., 2021; Khamdaeng et al., 2012; Peterson et al., 1960; Van de Vosse & Van Dongen, 1998). Table 2.2 summarizes the constant design parameters used to model the blood artery within the skin tissue and their material properties.

Table 2.2 Constant Geometrical Parameters of the Skin layer and Blood Vessel Model, and their material properties.

Geometrical Parameters	**Value**
Distance between Skin Surface and Blood Vessel ($a1$)	2.63 [mm]
Skin's Thickness below Blood Vessel ($a2$)	3 [mm]
Skin's Length and Blood Vessel's Length (c)	40 [mm]
Skin's Width (b)	20 [mm]
Blood Vessel's Diameter (d)	2.5 [mm]
Blood Vessel's Wall Thickness (w)	0.2 [mm]
Property	**Value**
Skin's Density (ρ_{Skin})	1109 [Kg/m^3]
Skin's Young's Modulus (E_{Skin})	0.1 [MPa]

Skin's Poisson's Ratio (ν_{Skin})	0.48
Blood Vessel's Density (ρ_{Vessel})	1160 [Kg/m^3]
Blood Vessel's Young's Modulus (E_{Vessel})	0.7 [MPa]
Blood Vessel's Poisson's Ratio (ν_{Vessel})	0.49

2.2 *Finite Element Analysis*

Numerical simulations were employed by means of the Finite Element Analysis (FEA) in COMSOL Multiphysics to investigate the output voltage of different piezoelectric metamaterials. The normal range of BP is reported to be between 80 $mmHg$ and 120 $mmHg$, which represent diastolic and systolic pressures, respectively (*High Blood Pressure Symptoms and Causes*, 2021). A 100 $mmHg$ BP was selected to compare the output voltage of different structures. In this work, BP was applied to the interior blood vessel geometry. The input and output blood flow surfaces of the skin were considered to have free deformation, as were the top and bottom of the skin tissue. The left and right sides of the skin were determined to have a fixed boundary condition. Using the solid mechanics module, a stress analysis of the model was employed to calculate the stress distribution in piezoelectric metamaterial, which led to computing the output voltage of the BP sensor using the strain-charge form of piezoelectric material and the electrostatics module. The strain and the electric potential generation were computed using the following equations:

$$S = s_E T + d^T E \tag{2.1}$$

$$D = dT + \varepsilon_T E \tag{2.2}$$

where S is strain, D is electric displacement, T is stress, and E is external electric field. s_E, d, and ε_T represent compliance matrix, coupling matrix, and relative permittivity matrix, respectively. There was no initial external electric field, so the generated electric potential was only due to the BP applied inside the artery, which led to stress distribution in the piezoelectric element. The electrodes on the two surfaces of the piezoelectric element were not defined for simplification of the geometry; instead, two terminals were considered on both sides of the piezoelectric element to calculate the output voltage. The surface that adheres to skin was determined to have zero voltage, and the top surface of the piezoelectric element was determined with a probe to calculate the average voltage of the sensor. A free tetrahedral mesh element was used for the entire model, and the minimum mesh size of the piezoelectric element was set to 5 µm.

To study the structural properties of the piezoelectric metamaterial, the angles of unit cells were evaluated. The angle of the middle unit cell can be selected freely in the available range, and the other unit cells' angles have a linear relationship with the middle one to have a uniform piezoelectric metamaterial structure. These unit cells' angles were considered for optimization and machine learning datasets.

2.3 Machine Learning

Utilizing machine learning techniques can facilitate the creation of a comprehensive design space for metamaterial structures in the development of the proposed piezoelectric BP sensor. Machine learning is a general term that refers to the process of applying prediction models to data or finding informative clusters within data (Greener et al., 2022). A problem is called a classification problem when it involves grouping data points into a set of discrete categories, while regression model outcomes have a continuous range of values, allowing for continuous prediction. Linear Regression is one of the simplest models used for the prediction of results, and it models the relationship between the independent output parameter and the dependent variable parameters (Acharya et al., 2019). In the case of having multiple dependent variable parameters and one dependent output parameter, Multiple Linear Regression is useful, which attempts to fit a linear equation to the dataset with several dependent variables (Acharya et al., 2019).

Polynomial Regression is a form of regression modeling, in which the relationship between an independent output parameter and the dependent variable parameter is modeled as an nth degree polynomial function (Ostertagová, 2012). Another regression model that can be potentially used is Support Vector Regression (SVR), which aims to place a channel (or a hyperplane according to the number of variable parameters) to allow for an acceptable margin(ε) for errors (Awad & Khanna, 2015). The distance between datapoints outside the proposed channel and the channel itself is called slack variables, and the algorithm tries to minimize these distances. In the case of nonlinearity in a dataset, a nonlinear kernel function can be used to train the datapoints instead of defining hyperplanes.

Another machine learning algorithm that can be used for regression problems is Decision Tree Regression, which works by splitting the data into smaller subsets based on a certain decision criterion, with the goal of creating a set of leaf nodes that each contain a subset of the data with similar characteristics (Xu et al., 2005). The predicted value for a given input is then calculated based on the values of the data points in the corresponding leaf node. Random Forest Regression is another machine learning method that works by combining the predictions of multiple decision tree models, which are trained on different subsets of the data, to make more accurate predictions than any individual tree (Rodriguez-Galiano et al., 2015). The resulting model is a "forest" of decision trees, which are "random" because each tree is trained on a different subset of the data.

In this work, 4,000 datapoints were obtained from simulations to predict the calculated output electric potential, and four different regression models were used: Polynomial, Support Vector, Decision Tree, and Random Forest. In all of the proposed regression models, 80% of the dataset was used for training the algorithms, and the rest was used as a test set for machine learning model validation. An R^2 score method was also used to compare the accuracy of the regression models. The R^2 score was calculated by taking the sum of the squared differences between the predicted values and the mean of the observed values, and dividing by the sum of the squared differences between the observed values and the mean of the observed values, which was a measure of the variance in the data by the regression model. A 4^{th} order polynomial function was used to train the dataset with a Polynomial Regression model, and for SVR training, a Radial Basis Function (RBF) kernel based on a Gaussian function was used to capture the nonlinear relationship in the data. The randomness of the Decision Tree and Random Forest models was set to zero to have a reliable comparison between different regression models, and the number of trees used for the Random Forest regression model was set to 10. The machine learning regression training models were developed in Python within the Google Colab platform.

2.4 *Optimization*

Piezoelectric BP sensors can generate electric potential according to the applied stress. Using a metamaterial-based piezoelectric element in a BP sensor, the angles of the unit cells were determined to maximize the output voltage of the sensor. The middle unit cell could have any angle within a certain range, and the surrounding unit cells' angles were linearly related to the middle one to create a uniform piezoelectric metamaterial structure. The calculations of the output voltage were carried out computationally. To perform an optimization on the design, LiveLink of COMSOL Multiphysics was used, which transformed the simulation commands into MATLAB codes.

A Bayesian optimization framework was used to achieve the best metamaterial design that maximizes the output voltage. Bayesian optimization is a method for optimizing a function that is time-consuming to evaluate or that has many local minima (Frazier, 2018). In Bayesian optimization, an acquisition function is used to guide the search for the optimal solution to a given problem. The acquisition function considers the current state of the optimization process and suggests the next best point to sample to improve the overall solution. This approach allows the optimization algorithm to explore the design space by constructing a surrogate model of the function, which is used to choose the next point to evaluate. This method begins with a prior distribution over the space of possible functions that encodes an initial belief about the shape of the objective function that the algorithm would optimize. Next, the function is evaluated at a few initial points, and the results are used to fit the surrogate model, which is used to choose the next point to evaluate. The results of evaluating new points are used to update the surrogate model, and this process is repeated until the optimum of the function is found or some stopping criterion is met. In this work, the optimization problem was solved using a pre-made Bayesian optimization function (bayesopt.m) in MATLAB (R2021a). The communication between the optimizer and the simulator was established via LiveLink (COMSOL Multiphysics) for optimization design. The algorithm could converge to the optimal design after 30 iterations in about 1.5 h using a performance desktop computer (10 cores of Intel Xeon CPU W-2255, 3.70 GHz (20 logical cores), 64 GB RAM, NVIDIA Quadro P2200 graphics card).

Chapter 3:
RESULTS

3.1 *Structural Comparison*

In the first set of simulations, a square-shaped piezoelectric element was compared to metamaterial structures with three different values of θ for all unit cells: 15°, 0°, and -15°, describing honeycomb, brick, and re-entrant metamaterials, respectively. Von-Mises stress and output electric voltage distributions were calculated for piezoelectric metamaterials and compared with square-shaped piezoelectric material when a BP of $100\ mmHg$ was applied to the inner surface of the blood vessel (Figure 3.1A). Since the blood vessel applied the incoming BP to the center of the structure, the deformation concentrated on the center of the sensor, which led to higher stress in the center and lower stress on the left and right sides of the sensor. According to the piezoelectric behavior of PVDF material, higher stress resulted in higher electric potential generation, which could be observed in the center of the sensor.

The electric potential calculated on the top surface of the sensor shows the output voltage of the BP sensor. To have a comparison between different structures' performances, another set of simulations was performed for each structure under various BPs in a range between diastolic and systolic pressures (80-120 *mmHg*). The stress analysis results for each structure showed an expected linear behavior when BP increased (Figure 3.1B). Another observation revealed that the square shape received less stress in comparison to metamaterial structures, and within the metamaterial structures, honeycomb metamaterial received the highest stress in the proposed range of BPs. Figure 3.1C shows the linear behavior of potential electric generation in piezoelectric structures as a result of stress distribution in the PVDF material. The simulation results showed that the honeycomb metamaterial generated the highest and the square-shaped material generated the lowest output voltage, respectively, as expected according to the stress analysis. In general, the BP sensor's performance was increased when the structure of the piezoelectric element was set to re-entrant, brick, or honeycomb metamaterial instead of the square structure.

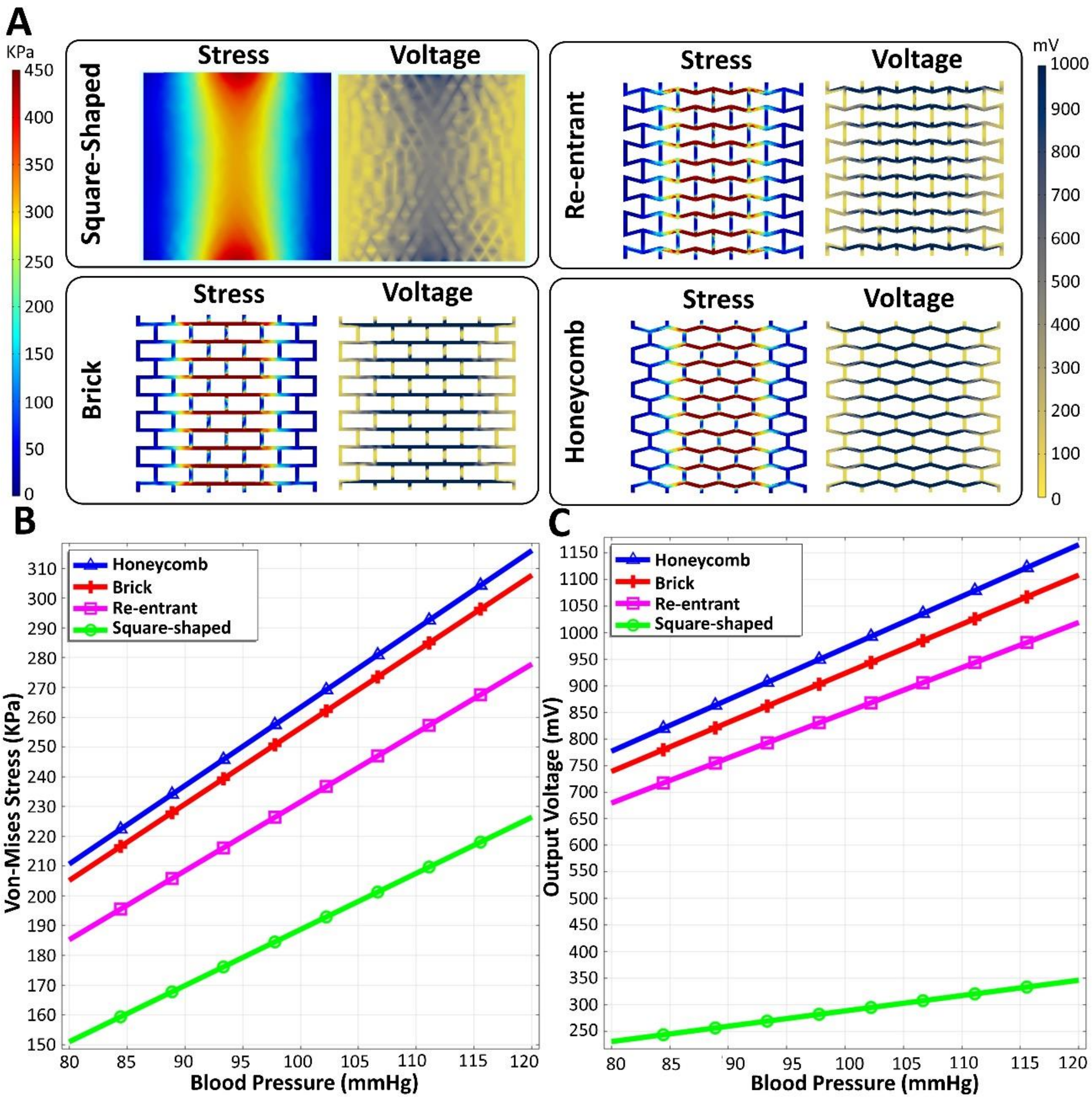

Figure 3.1 Stress analysis and voltage simulation results for different piezoelectric structures: square shape, re-entrant, brick, and honeycomb. (A) Von-mises stress and electric voltage distributions as results of 100 mmHg BP in the model. (B) Von-mises stress and (C) output voltage of different structures in the BP range between diastolic pressure (80 mmHg) and systolic pressure (120 mmHg).

3.2 Bayesian Optimization

Bayesian optimization allowed for maximizing the output voltage of the piezoelectric metamaterial-based BP sensor. The objective function was set to a negative value of electric potential computed on the top electrode within the simulation since the bayesopt.m function minimized the objective function. The angles of unit cells were selected as optimizable parameters to observe the effect of angles on the final output voltage. According to the design of the metamaterial, a design space was defined to organize the angles of unit cells in a uniform shape (Figure 3.2A). The whole structure was divided into three sets of unit cells: (i) the middle angle (the angle of the middle unit cell); (ii) the first layer of unit cells (the angles surrounding the middle unit cell); and (iii) the second layer of unit cells (the outer layers of the structure). The first optimizable parameter was the middle angle of the structure, which, according to the definition of the geometry, could have a value in the range of -30° and 30°. Since all other unit cells could also only have values in the defined range, two coefficients were used to set the value of other unit cells' angles based on the middle angle value. By defining a linear relationship between the middle angle and the first layer of unit cells using m coefficient, the angles of the first layer could get values fixed in the definition of the geometry since m coefficient could only have values between -1 and 1. The second layer of unit cells was also defined to get their angle values from the first layer linearly by n coefficient, which could get integer values of -1, 0, and 1. m and n coefficients were selected as the second and third optimizable parameters in the Bayesian optimization framework within the defined range. The values of n coefficient were set to integers to avoid low quality in the geometry and mesh while calculating the output voltage in the simulation.

Once the simulation using the FEM was set up, the optimizable variables, x, were fed into the Bayesian optimization algorithm to determine the optimal output voltage. Here, x was a 3D vector including two continuous variables, the middle angle and m coefficient, and an integer variable, which was n coefficient. The optimization problem was formulated as:

$$x^* = argmax\ f(x,p), subject\ to\ x_{min} \leq x\ \leq\ x_{max} \tag{3.1}$$

where $f(x,p)$ function is the estimated output voltage from the simulation, x^* is the optimal variable set, p is the fixed parameter set (Table 1), x_{min} is the lower bound of x, and x_{max} is the upper bound of x. Figure 3.2B illustrates the communication between the optimizer and the simulator using LiveLink. The algorithm begins by generating a random structure and then explores the design space by adjusting the optimizable variables to maximize the estimated output voltage as determined by a FEM simulation. In each iteration, a full FEM simulation is run, starting from the initial BP inside the vessel and ending with generating electric potential in piezoelectric metamaterial. As the number of iterations increases, the structure evolves toward the optimal design.

The expected improvement acquisition function was used, and the output voltage converged on a solution within 30 iterations (Figure 3.2C). The maximum output voltage calculated was $936\ mV$ when the BP was set to $100\ mmHg$. The m and n coefficients were selected to have values of 1 with the middle angle of 26° as the optimal design. As the optimal design is a honeycomb structure with unit cell angles of 26° for all unit cells, this honeycomb structure was selected for the proposed piezoelectric metamaterial BP sensor.

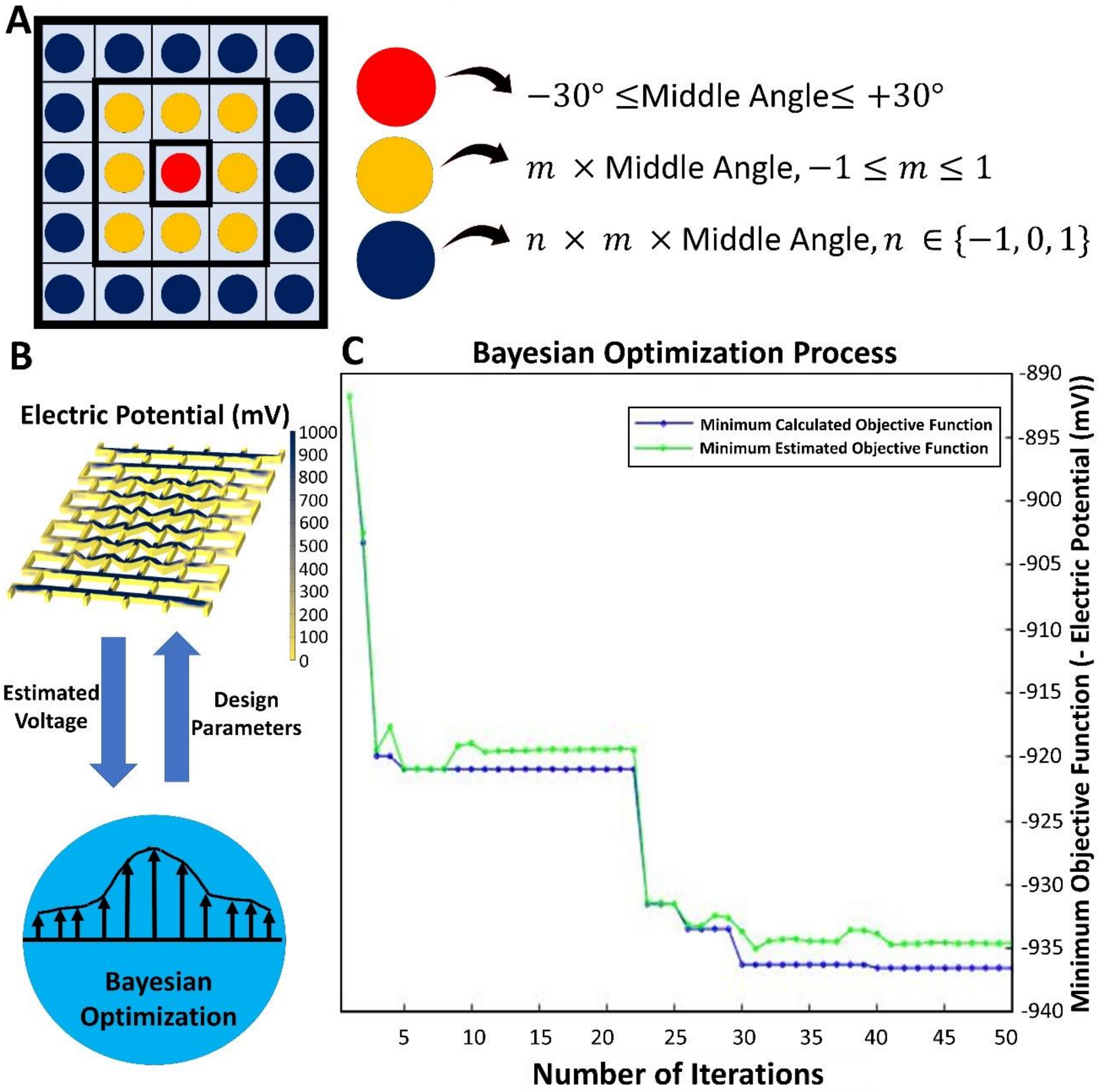

Figure 3.2 Bayesian Optimization Framework. (A) The proposed parameter definition to describe the relationship between angles of unit cells. The angle of the middle unit cell (the red unit cell) was selected as one of the optimizable variables with lower and upper

boundaries of -30 and 30 degrees, respectively. The angles of the first layer of unit cells (yellow unit cells) were defined to have a linear relationship with the middle angle with m coefficient which was a continuous optimizable variable in the range of -1 and 1. The angles of the third layer of unit cells (blue unit cells) were linearly related to the first layer angles with a binary optimizable variable n that could vary among -1,0 and 1 values. (B) A design optimization with the purpose of maximizing the output voltage of the piezoelectric metamaterial sensor along with the design constraints was supplied to the Bayesian optimization algorithm. The Bayesian optimizer provides design parameters to the simulator, and the simulator returns the estimated output voltage back using a FEM-based simulation. This process ran iteratively until the optimal design was achieved. (C) Process of the Bayesian optimization for minimizing the negative output voltage function, which maximizes the electric potential of the sensor. The minimum objective (y-axis) represents the negative values of the voltage simulated with FEM in mV unit. From the initial random trial, the process reaches the optimal value in around 30 iterations.

3.3 Regression Models

To discover the effects of the parameters in the optimization of the final output voltage, machine learning algorithms were used to perform regression models on the dataset that was generated from the simulation. The process started with assembling the dataset of the calculated output voltage of the piezoelectric metamaterial and its corresponding variable parameters: middle angle, m coefficient, and n coefficient. 4,000 datapoints were then prepared using FEM in the simulation, and four regression models were selected to train this dataset: Polynomial Regression, SVR, Decision Tree Regression, and Random Forest Regression. Figure 3.3ABCD illustrates the performance of these regression models based on the comparison between the predicted value and the computed value of the test set. The accuracies of these models were compared to each other using the R^2 score evaluation. The results of machine learning algorithms showed that the Random Forest Regression model performed better on the test set, with an R^2 score value of 0.990 in comparison to the other regression models.

Among the three variable parameters that were used for preparing the dataset, the middle angle and m coefficient were key parameters since they defined the majority of unit cell angles in the structure. To gain insights into the influence of the parameters on output voltage, a 2D reduction of the original 3D function was obtained by selecting two dimensions (middle angle and m coefficient) and replacing output voltage by an average value over the remaining one dimension (n coefficient). Reduced functionals can be plotted as 2D height maps for visualization and analysis. Figure 3.3E shows the 2D map resulting from the Random Forest Regression model for key parameters: the middle angle and m coefficient. In the illustration of the 2D map, the value of the generated electric potential is shown by color. The middle angle of the structure is set on the horizontal axis, and the vertical axis shows the values of m coefficient. The highest output voltage can be achieved when both the middle angle and the m coefficient are set to high positive values (upper right corner). When the middle angle has a positive value and the m coefficient has a high positive value close to 1, all unit cells have approximately equal positive values, which leads to a honeycomb structure. Another high value of output voltage results when the middle angle has a negative value close to -30° and the m coefficient also has a negative value close to -1, which leads to a single negative angle in the middle unit cell of the structure with positive angles for the surrounding unit cells, which makes a honeycomb structure for the majority of the geometry (left-down corner). In contrast, having a positive value for the middle angle and a negative value for the m coefficient, and vice versa, results in a re-entrant structure, which generates a lower electric potential in comparison to a honeycomb structure (right-down and left-up corners, respectively). The analysis also validates the result of Bayesian optimization for choosing a honeycomb structure as the optimal design among all possible combinations of optimizable variables within the design space.

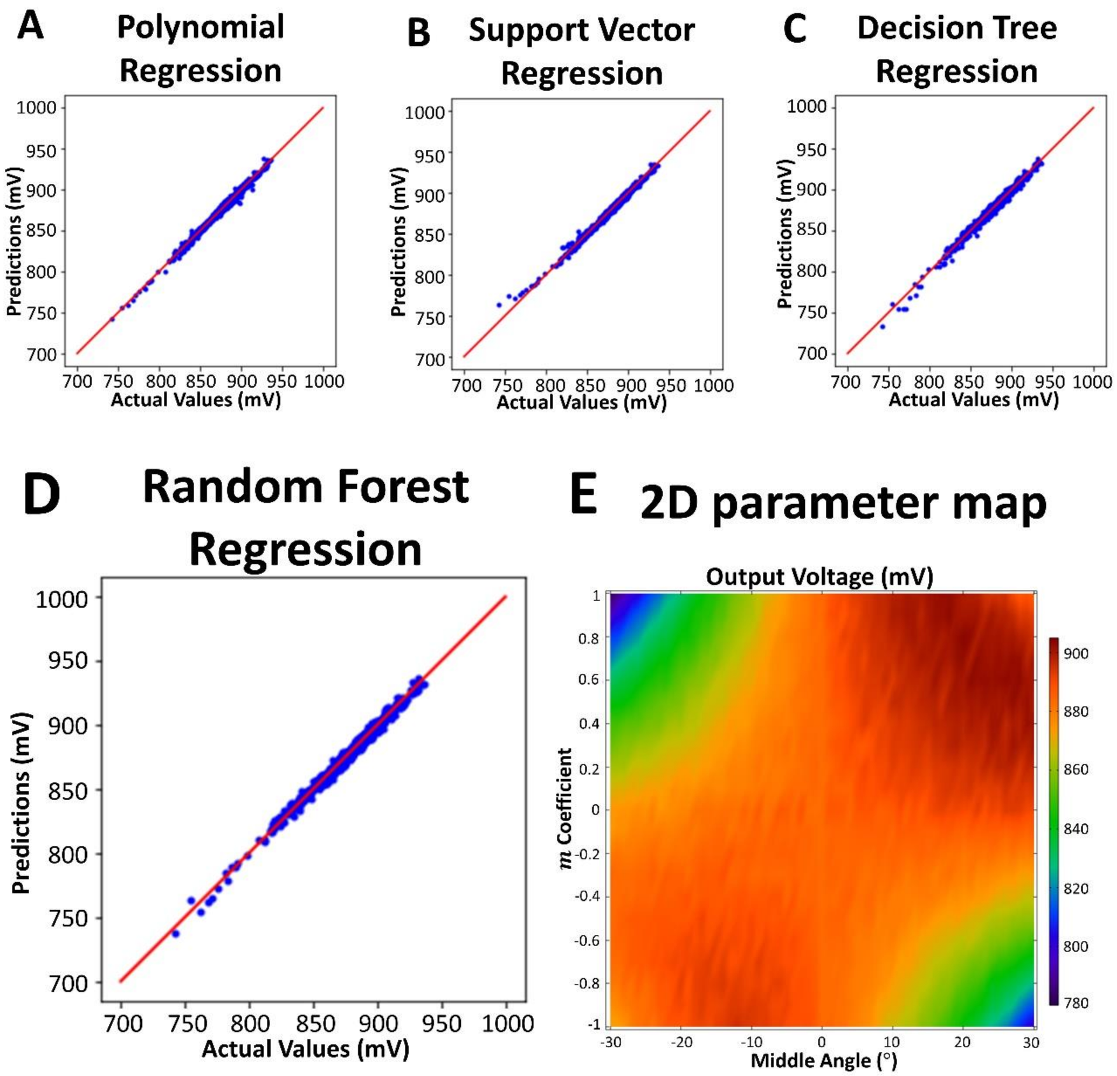

Figure 3.3 Four machine learning regression models were trained on 80 percent of the whole dataset (4000 datapoints), and the performance of the proposed models was evaluated by calculating the R2 score for actual values and predicted values on the test set (20 percent of the whole dataset). (A) A 4th order Polynomial Regression model's performance with an R2 score calculated of 0.988. (B) SVR model with a gaussian RBF kernel function and a calculated R2 score of 0.989. (C) Evaluation plot of the Decision Tree Regression model with a randomness value of 0, and the calculated R2 score for this model was 0.982. (D) Random Forest Regression model's performance plot with a randomness value of 0 and 10 trees. R2 score calculated for this model was 0.990 which was the best in comparison with other regression models. (E) 2D map of two interesting optimizable variables of middle angle and m coefficient according to the estimated values of the Random Forest Regression model. The plot shows that the highest possible output voltage can be obtained by a middle angle of 30 degrees and positive values for m coefficient which leads to a honeycomb structure for the piezoelectric metamaterial. In contrast, by having a negative value for the middle angle with positive values of m coefficient, or a positive value of the middle angle with negative values for m coefficient, which leads to more re-entrant structure in piezoelectric metamaterial, the output voltage of the sensor decreases.

3.4 *Time-dependent Blood Pressure*

Following the evaluation of metamaterial structures and optimized designs for the piezoelectric element of the BP sensor, a FEM simulation of time-dependent BP was conducted to investigate the mechanical response of blood vessels under different pressure conditions. BP typically varies throughout the day in a regular cycle known as the circadian rhythm. This cycle is generally characterized by a lower BP at night while a person is sleeping and a higher BP during the day when a person is active. The exact pattern of BP variation can vary from person to person, but in general, the highest BP readings tend to occur in the early afternoon, while the lowest readings typically occur in the early morning hours. The BP in the arteries varies constantly, even within a single second. When the heart contracts, the pressure in the arteries rises, reaching its peak, which is known as the systolic BP. As the heart relaxes and fills with blood, the pressure in the arteries decreases, reaching its lowest point, which is known as the diastolic BP. The exact pattern and magnitude of this fluctuation depend on factors such as heart rate, the elasticity of the arteries, and the amount of blood flowing through them.

Figure 4.1A shows time-dependent BP in one cycle that can pulsate blood vessel and skin tissue, which results in a variable output voltage. The generation of electric potential by different structures was calculated using a graph of time-dependent BP from diastolic pressure to systolic pressure during a single cycle (*High Blood Pressure Symptoms and Causes*, 2021). For the sake of simplification when simulating different piezoelectric structures with a time-dependent BP, it was assumed that the whole cycle of varying BP occurs in one second. Different structures were simulated: square shape, re-entrant metamaterial with -15° for all unit cells, brick metamaterial, honeycomb metamaterial with 15° for all unit cells, and optimal design metamaterial achieved from the Bayesian optimization framework. The electric potentials generated for the structures were calculated in a time-dependent simulation using COMSOL Multiphysics, and the applied BP was defined according to its variation during one second. Figure 4.1B compares the output voltage calculated for different structures. According to the simulation results, the square-shaped piezoelectric element generated the lowest electric potential, with the highest value of 339 mV. Metamaterial structures showed higher performance in generating electric potential in comparison to square-shaped piezoelectric element. The highest values calculated for re-entrant metamaterial, brick structure, and honeycomb structure were 982 mV, 1059 mV, and 1114 mV, respectively. As expected, the optimal design achieved using the Bayesian optimization framework showed the highest performance among all the tested structures, with the highest output voltage of 1123 mV when exposed to the mentioned time-dependent BP. As a result, the optimized metamaterial design demonstrates superior performance compared to the traditional square-shaped piezoelectric element, with a 231% increase in performance, indicating its potential use in the development of advanced piezoelectric BP sensors.

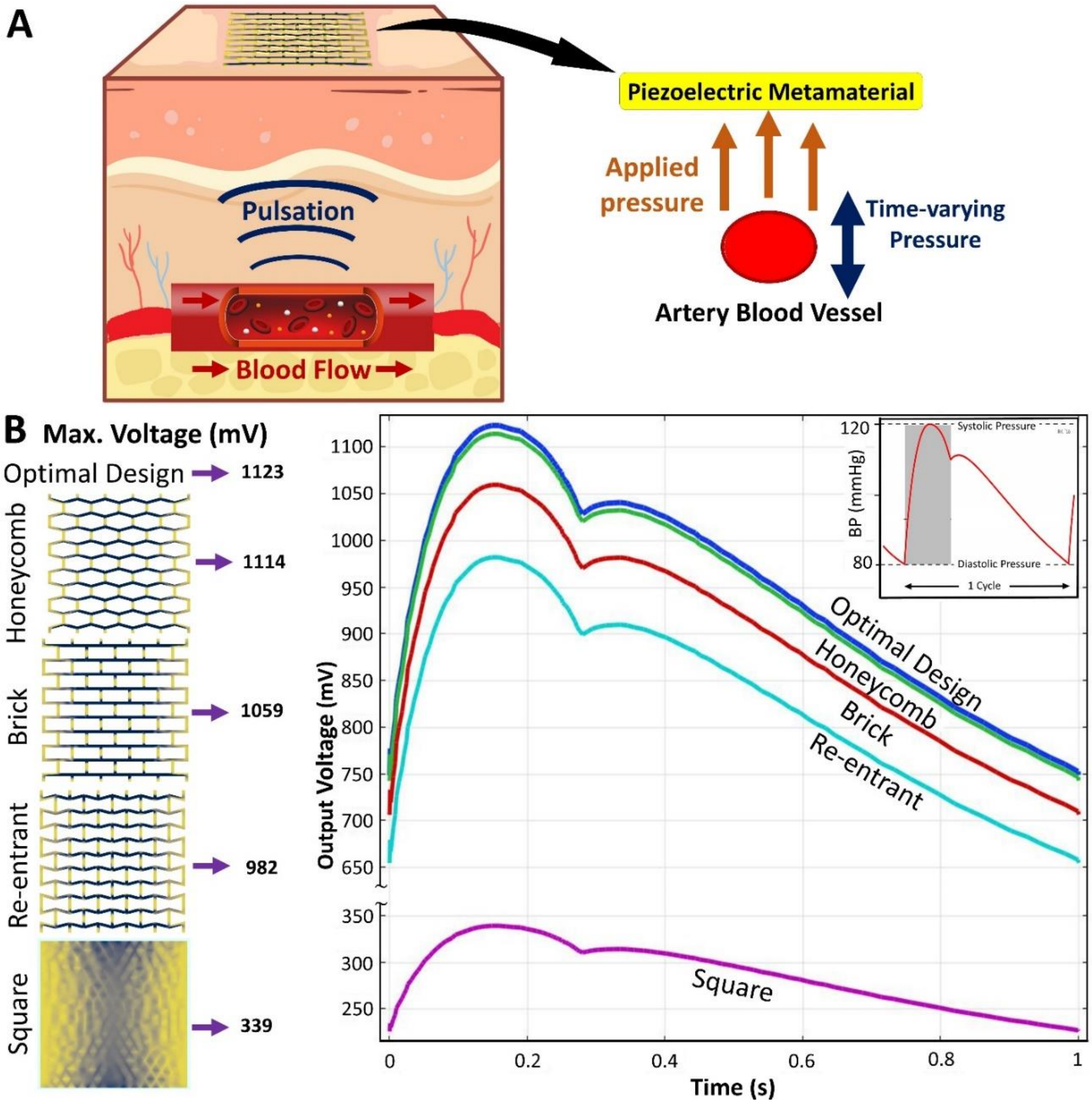

Figure 3.4 Time-dependent BP simulation output voltage results for different structures of piezoelectric elements. (A) The schematic of BP variation inside the vessel, which leads to a time-dependent output voltage of the sensor. The variation of BP inside the vessel leads to applying a pressure to the skin tissue. The stress applied to the sensor will be converted to an electric voltage by the piezoelectric element. (B) The right-up corner

plot shows a time-dependent BP function between 80 mmHg and 120 mmHg which represents diastolic and systolic BPs, respectively. The output electric potential for different piezoelectric architectures was calculated via FEM simulation. As it can be seen, the highest electric voltage that can be achieved with the square-shaped piezoelectric element was 339 mV, while the Bayesian optimization structure could generate a maximum amount of 1123 mV that was more than two times that of the square-shaped one. A general comparison between re-entrant, brick, and honeycomb structures is also shown in the middle of the chart, which emphasizes the importance of having honeycomb structures for the piezoelectric element of the sensor in order to have the highest value of output voltage.

3.5 Practical Considerations

According to computational results, the BP sensor, which was designed using a metamaterial approach, will increase the sensor's electric potential output. However, several practical considerations need to be taken into account for its fabrication and experimental testing. Various 3D printing techniques, such as fused deposition modeling (FDM), can be utilized to achieve the metamaterial structure of PVDF (Bodkhe & Ermanni, 2019). The polymer can be deposited over the planned route to obtain the desired microstructure. The poling process, which determines the material orientation, is essential for the fabrication of piezoelectric materials. Electric poling assisted additive manufacturing (EPAM), which applies electric fields between the print bed and the nozzle, allows FDM combined with simultaneous poling of PVDF to be performed (Lee & Tarbutton, 2014). The PVDF piezoelectric metamaterial can be sandwiched between two layers of aluminum-thin material, two pre-packaged copper wires can be used as electrical leads, and a conductive epoxy can connect them to thin layers of aluminum. The device can be encapsulated in a protective layer, such as silicon nitride, to prevent mechanical damage and exposure to the environment. A circuit system can be designed in such a way that the device can be connected to a battery-free liquid crystal display (LCD) for BP monitoring (Cheng et al., 2016). In this approach, each digit will be switched on if the electric potential increases as a result of the BP increase, and can activate the LCD's digits when the peaked BP exceeds a predetermined value.

The exact BP value could be directly displayed by designing an integrated circuit in which the voltage produced between the electrodes as a result of the piezoelectric layer deforming when pressure is applied is proportionate to the applied pressure and can be used to estimate the patient's BP, by applying the proper signal conditioning and data processing procedures (Wang & Lin, 2020). To eliminate low-frequency noise and baseline wandering, which is a phenomenon that can occur in piezoelectric BP sensors where the baseline of the voltage signal drifts or fluctuates over time, the voltage signal from the sensor can be first boosted using a low-noise amplifier and then fed through a high-pass filter. An analog-to-digital converter (ADC) can then digitize the filtered signal, which can then be stored in a microcontroller for further processing. It is essential to calibrate the sensor output against a reference standard, such as a commercial BP cuff or a more precise invasive measurement method, to convert the voltage signal into a BP reading. This calibration procedure entails determining the voltage output of the sensor for a series of known pressures and then fitting the data to a calibration curve.

To measure the response of the piezoelectric BP sensor, one of the most important considerations will be the effect of external forces such as mechanical pressure and temperature (Baptista et al., 2014). The design, manufacture, position, and orientation of the sensor in relation to the external force will influence the device’s behavior. Any pressure from the outside, such as from a finger or clothing, can deform the sensor's material and alter the monitored voltage signal. It is crucial to check that the sensor firmly adheres to the skin or other measurement site and that any clothing or other materials in contact with the sensor are not applying excessive pressure to reduce the impact of mechanical pressure. The piezoelectric material in the sensor may expand or contract as a result of temperature variations, changing the detected voltage signal. Ensuring that the sensor is not exposed to temperature extremes or quick temperature swings will help to increase the sensor’s accuracy. By considering these factors, researchers can ensure the accuracy and reliability of the piezoelectric BP sensor.

Chapter 4:
CONCLUSION

Continuously monitoring BP can enable the identification of early-stage cardiovascular diseases. Traditional piezoelectric methods have the ability to detect biological signals due to their good dynamic responses, but their significant power consumption limits the operation of BP sensors. While different piezoelectric materials can be used to enhance the self-powered BP sensor responses, altering the structure of the piezoelectric element can also lead to a higher output voltage. In this work, the use of piezoelectric metamaterials in BP sensors was investigated, calculated, and compared to other architectures. A Bayesian optimization framework was used to determine the best design based on the metamaterial design space. Machine learning algorithms were then used to apply regression models to simulated data and visualize a 2D map of relevant parameters. Finally, time-dependent BP was applied to the inner surface of an artery within a 3D tissue skin model to compare the output voltage of different metamaterials. The results showed that all types of metamaterials could generate a higher electric potential compared to normal square-shaped piezoelectric elements. Bayesian optimization indicated that honeycomb metamaterials had the best performance in generating output voltage, which was confirmed by the regression model analysis from the machine learning algorithms. The final simulation of time-dependent BP in a 3D skin tissue model revealed that the optimal design recommended by Bayesian optimization can produce an electric potential more than twice as high as that of a regular square-shaped piezoelectric element.

Several practical considerations should be taken into account during its fabrication and experimental testing. FDM is a suitable 3D printing technique to achieve the metamaterial structure of PVDF, and the EPAM technique can be used to perform FDM combined with simultaneous poling of the printed material. An integrated circuit can be designed to directly display a patient's BP by utilizing the voltage produced by the BP sensor, which should be calibrated to convert the voltage signal into a BP reading. External forces such as mechanical pressure and temperature should be taken into consideration when measuring the response of a proposed piezoelectric BP sensor.

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APPENDIX A: MATLAB & PYTHON CODES

COMSOL model of Piezoelectric Metamaterial BP sensor in MATLAB

```
    function [Voltage] = SkinAddedCode( angle, M, N)
    %
    % SkinAdded1.m
    %
    % Model exported on Oct 2 2022, 20:11 by COMSOL 6.0.0.318.

    import com.comsol.model.*
    import com.comsol.model.util.*

    model = ModelUtil.create('Model');

    model.modelPath('D:\Abdollah\10');

    model.component.create('comp1', true);

    model.component('comp1').geom.create('geom1', 3);

    model.component('comp1').mesh.create('mesh1');

    model.component('comp1').physics.create('es', 'Electrostatics',
'geom1');
    model.component('comp1').physics('es').create('ccnp1',
'ChargeConservationPiezo');
    model.component('comp1').physics('es').feature('ccnp1').selection.a
ll;
    model.component('comp1').physics.create('solid', 'SolidMechanics',
'geom1');
    model.component('comp1').physics('solid').create('pzm1',
'PiezoelectricMaterialModel');
    model.component('comp1').physics('solid').feature('pzm1').selection
.all;

    model.component('comp1').multiphysics.create('pze1',
'PiezoelectricEffect', 3);
    model.component('comp1').multiphysics('pze1').set('Solid_physics',
'solid');
    model.component('comp1').multiphysics('pze1').set('Electrostatics_p
hysics', 'es');

    model.study.create('std1');
    model.study('std1').create('stat', 'Stationary');
    model.study('std1').feature('stat').setSolveFor('/physics/es',
true);
    model.study('std1').feature('stat').setSolveFor('/physics/solid',
true);
    model.study('std1').feature('stat').setSolveFor('/multiphysics/pze1
', true);
```

```
%angle = 30;
%M = 1;
%N = 1;

midAngle = num2str(angle);
mm = M/10;
m = num2str(mm);
n = num2str(N);

deg = '[deg]';

model.param.set('midAngle', append(midAngle,deg));

model.param.set('m', m);

model.param.set('n', n);


model.param.set('th', '0.2');
model.param.descr('th', '');
model.param.set('hi', '0.2');
model.param.descr('hi', '');
model.param.set('dc', '2');
model.param.descr('dc', '');
model.param.set('hc', 'dc/2');
model.param.descr('hc', '');
model.param.set('a', '0.5');
model.param.descr('a', '');



model.param.set('thetaM', 'm*midAngle');
model.param.descr('thetaM', '');
model.param.set('thetaE', 'n*thetaM');
model.param.descr('thetaE', '');


model.param.set('theta1', 'thetaE');
model.param.descr('theta1', '');
model.param.set('theta2', 'thetaE');
model.param.descr('theta2', '');
model.param.set('theta3', 'thetaE');
model.param.descr('theta3', '');
model.param.set('theta4', 'thetaE');
model.param.descr('theta4', '');
model.param.set('theta5', 'thetaE');
model.param.descr('theta5', '');
model.param.set('theta6', 'thetaE');
model.param.descr('theta6', '');
model.param.set('theta10', 'thetaE');
model.param.descr('theta10', '');
model.param.set('theta11', 'thetaE');
model.param.descr('theta11', '');
model.param.set('theta15', 'thetaE');
model.param.descr('theta15', '');
model.param.set('theta16', 'thetaE');
model.param.descr('theta16', '');
```

```
model.param.set('theta20', 'thetaE');
model.param.descr('theta20', '');
model.param.set('theta21', 'thetaE');
model.param.descr('theta21', '');
model.param.set('theta22', 'thetaE');
model.param.descr('theta22', '');
model.param.set('theta23', 'thetaE');
model.param.descr('theta23', '');
model.param.set('theta24', 'thetaE');
model.param.descr('theta24', '');
model.param.set('theta25', 'thetaE');
model.param.descr('theta25', '');



model.param.set('theta7', 'thetaM');
model.param.descr('theta7', '');
model.param.set('theta8', 'thetaM');
model.param.descr('theta8', '');
model.param.set('theta9', 'thetaM');
model.param.descr('theta9', '');
model.param.set('theta12', 'thetaM');
model.param.descr('theta12', '');
model.param.set('theta14', 'thetaM');
model.param.descr('theta14', '');
model.param.set('theta17', 'thetaM');
model.param.descr('theta17', '');
model.param.set('theta18', 'thetaM');
model.param.descr('theta18', '');
model.param.set('theta19', 'thetaM');
model.param.descr('theta19', '');



model.param.set('theta13', 'midAngle');
model.param.descr('theta13', '');




model.param.set('anch1', 'hc*tan(theta1)');
model.param.descr('anch1', '');
model.param.set('coc1', 'a*hc-anch1/2');
model.param.descr('coc1', '');
model.param.set('anch2', 'hc*tan(theta2)');
model.param.descr('anch2', '');
model.param.set('coc2', 'a*hc-anch2/2');
model.param.descr('coc2', '');
model.param.set('anch3', 'hc*tan(theta3)');
model.param.descr('anch3', '');
model.param.set('coc3', 'a*hc-anch3/2');
model.param.descr('coc3', '');
model.param.set('anch4', 'hc*tan(theta4)');
model.param.descr('anch4', '');
model.param.set('coc4', 'a*hc-anch4/2');
model.param.descr('coc4', '');
model.param.set('anch5', 'hc*tan(theta5)');
model.param.descr('anch5', '');
```

```
model.param.set('coc5', 'a*hc-anch5/2');
model.param.descr('coc5', '');
model.param.set('anch6', 'hc*tan(theta6)');
model.param.descr('anch6', '');
model.param.set('coc6', 'a*hc-anch6/2');
model.param.descr('coc6', '');
model.param.set('anch7', 'hc*tan(theta7)');
model.param.descr('anch7', '');
model.param.set('coc7', 'a*hc-anch7/2');
model.param.descr('coc7', '');
model.param.set('anch8', 'hc*tan(theta8)');
model.param.descr('anch8', '');
model.param.set('coc8', 'a*hc-anch8/2');
model.param.descr('coc8', '');
model.param.set('anch9', 'hc*tan(theta9)');
model.param.descr('anch9', '');
model.param.set('coc9', 'a*hc-anch9/2');
model.param.descr('coc9', '');
model.param.set('anch10', 'hc*tan(theta10)');
model.param.descr('anch10', '');
model.param.set('coc10', 'a*hc-anch10/2');
model.param.descr('coc10', '');
model.param.set('anch11', 'hc*tan(theta11)');
model.param.descr('anch11', '');
model.param.set('coc11', 'a*hc-anch11/2');
model.param.descr('coc11', '');
model.param.set('anch12', 'hc*tan(theta12)');
model.param.descr('anch12', '');
model.param.set('coc12', 'a*hc-anch12/2');
model.param.descr('coc12', '');
model.param.set('anch13', 'hc*tan(theta13)');
model.param.descr('anch13', '');
model.param.set('coc13', 'a*hc-anch13/2');
model.param.descr('coc13', '');
model.param.set('anch14', 'hc*tan(theta14)');
model.param.descr('anch14', '');
model.param.set('coc14', 'a*hc-anch14/2');
model.param.descr('coc14', '');
model.param.set('anch15', 'hc*tan(theta15)');
model.param.descr('anch15', '');
model.param.set('coc15', 'a*hc-anch15/2');
model.param.descr('coc15', '');
model.param.set('anch16', 'hc*tan(theta16)');
model.param.descr('anch16', '');
model.param.set('coc16', 'a*hc-anch16/2');
model.param.descr('coc16', '');
model.param.set('anch17', 'hc*tan(theta17)');
model.param.descr('anch17', '');
model.param.set('coc17', 'a*hc-anch17/2');
model.param.descr('coc17', '');
model.param.set('anch18', 'hc*tan(theta18)');
model.param.descr('anch18', '');
model.param.set('coc18', 'a*hc-anch18/2');
model.param.descr('coc18', '');
model.param.set('anch19', 'hc*tan(theta19)');
model.param.descr('anch19', '');
model.param.set('coc19', 'a*hc-anch19/2');
model.param.descr('coc19', '');
model.param.set('anch20', 'hc*tan(theta20)');
model.param.descr('anch20', '');
```

```
    model.param.set('coc20', 'a*hc-anch20/2');
    model.param.descr('coc20', '');
    model.param.set('anch21', 'hc*tan(theta21)');
    model.param.descr('anch21', '');
    model.param.set('coc21', 'a*hc-anch21/2');
    model.param.descr('coc21', '');
    model.param.set('anch22', 'hc*tan(theta22)');
    model.param.descr('anch22', '');
    model.param.set('coc22', 'a*hc-anch22/2');
    model.param.descr('coc22', '');
    model.param.set('anch23', 'hc*tan(theta23)');
    model.param.descr('anch23', '');
    model.param.set('coc23', 'a*hc-anch23/2');
    model.param.descr('coc23', '');
    model.param.set('anch24', 'hc*tan(theta24)');
    model.param.descr('anch24', '');
    model.param.set('coc24', 'a*hc-anch24/2');
    model.param.descr('coc24', '');
    model.param.set('anch25', 'hc*tan(theta25)');
    model.param.descr('anch25', '');
    model.param.set('coc25', 'a*hc-anch25/2');
    model.param.descr('coc25', '');
    model.param.set('pp', '100[mmHg]');
    model.param.descr('pp', '');


    model.component('comp1').geom('geom1').lengthUnit('mm');
    model.component('comp1').geom('geom1').create('wp1', 'WorkPlane');
    model.component('comp1').geom('geom1').feature('wp1').set('unite',
true);

    model.component('comp1').geom('geom1').feature('wp1').geom.create('
pol1', 'Polygon');
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'pol1').set('source', 'table');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').set('type', 'open');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 0, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 0, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 1, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1', 1, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 2, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1+anch1', 2, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 3, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 3, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 4, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc1', 4, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 5, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 5, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 6, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc1', 6, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 7, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 7, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 8, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 8, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 9, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 9, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 10, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 11, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 11, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 12, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1+anch1', 12, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 13, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2', 13, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 14, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 14, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 15, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 15, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 16, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2', 16, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 17, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2+anch2', 17, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 18, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 18, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 19, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 19, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 20, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 21, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 21, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 22, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 22, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 23, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 23, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 24, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 24, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 25, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 25, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 26, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 26, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 27, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2+anch2', 27, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 28, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 28, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 29, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 29, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 30, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 30, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 31, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 31, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 32, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3+anch3', 32, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 33, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc3', 33, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 34, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 34, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 35, 0);
```

```
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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'pol1').setIndex('table', 'hc+coc3', 37, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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'pol1').setIndex('table', '2*hc-coc3', 40, 1);
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc3', 41, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 42, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3+anch3', 42, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 43, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 43, 1);
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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'pol1').setIndex('table', '6*hc', 46, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 46, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 47, 0);
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'pol1').setIndex('table', 'coc4+anch4', 47, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 48, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 48, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 49, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 49, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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```
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'pol1').setIndex('table', '2*hc-coc3', 51, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 52, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 52, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 53, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 53, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 54, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 55, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 55, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 56, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 56, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 57, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4+anch4', 57, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 58, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4', 58, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 59, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 59, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 60, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 60, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 61, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4', 61, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 62, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 62, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 63, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 63, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 64, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 64, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 65, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 65, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 66, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 66, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 67, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 67, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 68, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 68, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 69, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 69, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 70, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 70, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 71, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 71, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 72, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 72, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 73, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5', 73, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 74, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 74, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 75, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5', 75, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 76, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 76, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 77, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 77, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 78, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 78, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 79, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 79, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 80, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 80, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 81, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6', 81, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 82, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6+anch6', 82, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 83, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 83, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 84, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc6', 84, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 85, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 85, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 86, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc6', 86, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 87, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 87, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 88, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 88, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 89, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 89, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 90, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 90, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 91, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 91, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 92, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6+anch6', 92, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 93, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7', 93, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 94, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 94, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 95, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 95, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 96, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7', 96, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 97, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7+anch7', 97, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 98, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 98, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 99, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 99, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 100, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 100, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 101, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 101, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 102, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 102, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 103, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 103, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 104, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 104, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 105, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 105, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 106, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 106, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 107, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7+anch7', 107, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 108, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 108, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 109, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 109, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 110, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 110, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 111, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 111, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 112, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8+anch8', 112, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 113, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 113, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 114, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 114, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 115, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 115, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 116, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 116, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 117, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 117, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 118, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 118, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 119, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 119, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 120, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 120, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 121, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 121, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 122, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8+anch8', 122, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 123, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 123, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 124, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 124, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 125, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 125, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 126, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 126, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 127, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9+anch9', 127, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 128, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 128, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 129, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 129, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 130, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 130, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 131, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 131, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 132, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 132, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 133, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 133, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 134, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 134, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 135, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 135, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 136, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 136, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 137, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9+anch9', 137, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 138, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9', 138, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 139, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 139, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 140, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 140, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 141, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9', 141, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 142, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 142, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 143, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 143, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 144, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 144, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 145, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 145, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 146, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 146, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 147, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 147, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 148, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 148, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 149, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 149, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 150, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 150, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 151, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 151, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 152, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 152, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 153, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10', 153, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 154, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 154, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 155, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10', 155, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 156, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 156, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 157, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 157, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 158, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 158, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 159, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 159, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 160, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 160, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 161, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11', 161, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 162, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11+anch11', 162, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 163, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 163, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 164, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc11', 164, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 165, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 165, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 166, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc11', 166, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 167, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 167, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 168, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 168, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 169, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 169, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 170, 0);
```

```
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 170, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 171, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 171, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 172, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11+anch11', 172, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 173, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12', 173, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 174, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 174, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 175, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 175, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 176, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12', 176, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 177, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12+anch12', 177, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 178, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 178, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 179, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 179, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 180, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 180, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 181, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 181, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 182, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 182, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 183, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 183, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 184, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 184, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 185, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 185, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 186, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 186, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 187, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12+anch12', 187, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 188, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 188, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 189, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 189, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 190, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 190, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 191, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 191, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 192, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13+anch13', 192, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 193, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 193, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 194, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 194, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 195, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 195, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 196, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 196, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 197, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 197, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 198, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 198, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 199, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 199, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 200, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 200, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 201, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 201, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 202, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13+anch13', 202, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 203, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 203, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 204, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 204, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 205, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 205, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 206, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 206, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 207, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14+anch14', 207, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 208, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 208, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 209, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 209, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 210, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 210, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 211, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 211, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 212, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 212, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 213, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 213, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 214, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 214, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 215, 0);
```

```
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 215, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 216, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 216, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 217, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14+anch14', 217, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 218, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14', 218, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 219, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 219, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 220, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 220, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 221, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14', 221, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 222, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 222, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 223, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 223, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 224, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 224, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 225, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 225, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 226, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 226, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 227, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 227, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 228, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 228, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 229, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 229, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 230, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 230, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 231, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 231, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 232, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 232, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 233, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15', 233, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 234, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 234, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 235, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15', 235, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 236, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 236, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 237, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 237, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 238, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 238, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 239, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 239, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 240, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 240, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 241, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16', 241, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 242, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16+anch16', 242, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 243, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 243, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 244, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc16', 244, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 245, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 245, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 246, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc16', 246, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 247, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 247, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 248, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 248, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 249, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 249, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 250, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 250, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 251, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 251, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 252, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16+anch16', 252, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 253, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17', 253, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 254, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 254, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 255, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 255, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 256, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17', 256, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 257, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17+anch17', 257, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 258, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc17', 258, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 259, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 259, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 260, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 260, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 261, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 261, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 262, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc17', 262, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 263, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 263, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 264, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 264, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 265, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 265, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 266, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc17', 266, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 267, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17+anch17', 267, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 268, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 268, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 269, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 269, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 270, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 270, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 271, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 271, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 272, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18+anch18', 272, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 273, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc18', 273, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 274, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 274, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 275, 0);
```

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model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 275, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 276, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 276, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 277, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc18', 277, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 278, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 278, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 279, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 279, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 280, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 280, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 281, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc18', 281, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 282, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18+anch18', 282, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 283, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 283, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 284, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 284, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 285, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 285, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 286, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 286, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 287, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19+anch19', 287, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 288, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 288, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 289, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 289, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 290, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 290, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 291, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 291, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 292, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 292, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 293, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 293, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 294, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 294, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 295, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 295, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 296, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 296, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 297, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19+anch19', 297, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 298, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19', 298, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 299, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 299, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 300, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 300, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 301, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19', 301, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 302, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 302, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 303, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 303, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 304, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 304, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 305, 0);
```

```
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 305, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 306, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 306, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 307, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 307, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 308, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 308, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 309, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 309, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 310, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 310, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 311, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 311, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 312, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 312, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 313, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20', 313, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 314, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 314, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 315, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20', 315, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 316, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 316, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 317, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 317, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 318, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 318, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 319, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 319, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 320, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 320, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 321, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21', 321, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 322, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21+anch21', 322, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 323, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 323, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 324, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc21', 324, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 325, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 325, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 326, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc21', 326, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 327, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 327, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 328, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 328, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 329, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 329, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 330, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 330, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 331, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 331, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 332, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21+anch21', 332, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 333, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22', 333, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 334, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 334, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 335, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 335, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 336, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22', 336, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 337, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22+anch22', 337, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 338, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 338, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 339, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 339, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 340, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 340, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 341, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 341, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 342, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 342, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 343, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 343, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 344, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 344, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 345, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 345, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 346, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 346, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 347, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22+anch22', 347, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 348, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 348, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 349, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 349, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 350, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 350, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 351, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 351, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 352, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23+anch23', 352, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 353, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 353, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 354, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 354, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 355, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 355, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 356, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 356, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 357, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 357, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 358, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 358, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 359, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 359, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 360, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 360, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 361, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 361, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 362, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23+anch23', 362, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 363, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 363, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 364, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 364, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 365, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 365, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 366, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 366, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 367, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc24+anch24', 367, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 368, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc24', 368, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 369, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 369, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 370, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 370, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 371, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 371, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 372, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc24', 372, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 373, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc24', 373, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 374, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 374, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 375, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc24', 375, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 376, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc24', 376, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 377, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc24+anch24', 377, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 378, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc24', 378, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 379, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 379, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 380, 0);
```

```
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 380, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 381, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc24', 381, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 382, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25+anch25', 382, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 383, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 383, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 384, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc24', 384, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 385, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 385, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 386, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc24', 386, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 387, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 387, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 388, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 388, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 389, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 389, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 390, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 390, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 391, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 391, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 392, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25+anch25', 392, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 393, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25', 393, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 394, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 394, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 395, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25', 395, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 396, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25+anch25', 396, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 397, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 397, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 398, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 398, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 399, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 399, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 0, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 0, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 1, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1', 1, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 2, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1+anch1', 2, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 3, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 3, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 4, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc1', 4, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 5, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 5, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 6, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc1', 6, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 7, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 7, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 8, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 8, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 9, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 9, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 10, 0);
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 10, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 11, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc1', 11, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 12, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc1+anch1', 12, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 13, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2', 13, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 14, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 14, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 15, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 15, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 16, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2', 16, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 17, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2+anch2', 17, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 18, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 18, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 19, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 19, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 20, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 20, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 21, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc2', 21, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 22, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 22, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 23, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 23, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 24, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 24, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 25, 0);
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 25, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 26, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc2', 26, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 27, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc2+anch2', 27, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 28, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 28, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 29, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 29, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 30, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 30, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 31, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 31, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 32, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3+anch3', 32, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 33, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc3', 33, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 34, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 34, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 35, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 35, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 36, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 36, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 37, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc3', 37, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 38, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 38, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 39, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 39, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 40, 0);
```

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model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 40, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 41, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc3', 41, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 42, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3+anch3', 42, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 43, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 43, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 44, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 44, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 45, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 45, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 46, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc3', 46, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 47, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4+anch4', 47, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 48, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 48, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 49, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 49, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 50, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 50, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 51, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc3', 51, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 52, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 52, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 53, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 53, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 54, 0);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 54, 1);
   model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 55, 0);
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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 55, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 56, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc4', 56, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 57, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4+anch4', 57, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 58, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4', 58, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 59, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 59, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 60, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 60, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 61, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc4', 61, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 62, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 62, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 63, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 63, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 64, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 64, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 65, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 65, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 66, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc4', 66, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 67, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 67, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 68, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 68, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 69, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 69, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 70, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 70, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 71, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 71, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 72, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 72, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 73, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5', 73, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 74, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 74, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 75, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5', 75, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 76, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'coc5+anch5', 76, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 77, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc+coc5', 77, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 78, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc-coc5', 78, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 79, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 79, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 80, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 80, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 81, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6', 81, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 82, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6+anch6', 82, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 83, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 83, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 84, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc6', 84, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 85, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 85, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 86, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc6', 86, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 87, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 87, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 88, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 88, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 89, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 89, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 90, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 90, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 91, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc6', 91, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 92, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc6+anch6', 92, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 93, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7', 93, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 94, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 94, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 95, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 95, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 96, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7', 96, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 97, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7+anch7', 97, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 98, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 98, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 99, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 99, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 100, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 100, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 101, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc7', 101, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 102, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 102, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 103, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 103, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 104, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 104, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 105, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 105, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 106, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc7', 106, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 107, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc7+anch7', 107, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 108, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 108, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 109, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 109, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 110, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 110, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 111, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 111, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 112, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8+anch8', 112, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 113, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 113, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 114, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 114, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 115, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 115, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 116, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 116, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 117, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 117, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 118, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 118, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 119, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 119, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 120, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 120, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 121, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc8', 121, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 122, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8+anch8', 122, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 123, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 123, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 124, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 124, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 125, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 125, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 126, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc8', 126, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 127, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9+anch9', 127, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 128, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 128, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 129, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 129, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 130, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 130, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 131, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc8', 131, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 132, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 132, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 133, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 133, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 134, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 134, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 135, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 135, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 136, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc9', 136, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 137, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9+anch9', 137, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 138, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9', 138, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 139, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 139, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 140, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 140, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 141, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc9', 141, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 142, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 142, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 143, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 143, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 144, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 144, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 145, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 145, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 146, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc9', 146, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 147, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 147, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 148, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 148, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 149, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 149, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 150, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 150, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 151, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 151, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 152, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 152, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 153, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10', 153, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 154, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 154, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 155, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10', 155, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 156, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc+coc10+anch10', 156, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 157, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc+coc10', 157, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 158, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc-coc10', 158, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 159, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 159, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 160, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 160, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 161, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11', 161, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 162, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11+anch11', 162, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 163, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 163, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 164, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc11', 164, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 165, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 165, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 166, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc11', 166, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 167, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 167, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 168, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 168, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 169, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 169, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 170, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 170, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 171, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc11', 171, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 172, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc11+anch11', 172, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 173, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12', 173, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 174, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 174, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 175, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 175, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 176, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12', 176, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 177, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12+anch12', 177, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 178, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 178, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 179, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 179, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 180, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 180, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 181, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc12', 181, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 182, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 182, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 183, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 183, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 184, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 184, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 185, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 185, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 186, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc12', 186, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 187, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc12+anch12', 187, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 188, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 188, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 189, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 189, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 190, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 190, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 191, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 191, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 192, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13+anch13', 192, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 193, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 193, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 194, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 194, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 195, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 195, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 196, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 196, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 197, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 197, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 198, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 198, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 199, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 199, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 200, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 200, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 201, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc13', 201, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 202, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13+anch13', 202, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 203, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 203, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 204, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 204, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 205, 0);
```

```
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 205, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 206, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc13', 206, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 207, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14+anch14', 207, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 208, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 208, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 209, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 209, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 210, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 210, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 211, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc13', 211, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 212, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 212, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 213, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 213, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 214, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 214, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 215, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 215, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 216, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc14', 216, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 217, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14+anch14', 217, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 218, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14', 218, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 219, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 219, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 220, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 220, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 221, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc14', 221, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 222, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 222, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 223, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 223, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 224, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 224, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 225, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 225, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 226, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc14', 226, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 227, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 227, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 228, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 228, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 229, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 229, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 230, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 230, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 231, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 231, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 232, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 232, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 233, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15', 233, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 234, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+0', 234, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 235, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15', 235, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 236, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+coc15+anch15', 236, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 237, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+hc+coc15', 237, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 238, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc-coc15', 238, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 239, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 239, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 240, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 240, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 241, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16', 241, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 242, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16+anch16', 242, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 243, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 243, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 244, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc16', 244, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 245, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 245, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 246, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc16', 246, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 247, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 247, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 248, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 248, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 249, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 249, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 250, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 250, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 251, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc16', 251, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 252, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc16+anch16', 252, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 253, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17', 253, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 254, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 254, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 255, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 255, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 256, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17', 256, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 257, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc17+anch17', 257, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 258, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc17', 258, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 259, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 259, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 260, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 260, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 261, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc17', 261, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 262, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc17', 262, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 263, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 263, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 264, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 264, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 265, 0);
```

```
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc-coc18', 265, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '7*hc', 266, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+3*hc+coc17', 266, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '7*hc', 267, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc+coc17+anch17', 267, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 268, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc+coc18', 268, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 269, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc', 269, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 270, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc', 270, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 271, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc+coc18', 271, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '5*hc', 272, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+2*hc+coc18+anch18', 272, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '5*hc', 273, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+3*hc+coc18', 273, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 274, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc-coc18', 274, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 275, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc', 275, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 276, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc-coc18', 276, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '5*hc', 277, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+3*hc+coc18', 277, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc', 278, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc-coc18', 278, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc', 279, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc+4*hc', 279, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '4*hc', 280, 0);
```

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    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 280, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 281, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc18', 281, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 282, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18+anch18', 282, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 283, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 283, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 284, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 284, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 285, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 285, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 286, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc18', 286, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 287, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19+anch19', 287, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 288, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 288, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 289, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 289, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 290, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 290, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 291, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc18', 291, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 292, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 292, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 293, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 293, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 294, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 294, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 295, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 295, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 296, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc19', 296, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 297, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19+anch19', 297, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 298, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19', 298, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 299, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 299, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 300, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 300, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 301, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc19', 301, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 302, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 302, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 303, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 303, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 304, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 304, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 305, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 305, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 306, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc19', 306, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 307, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 307, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 308, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 308, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 309, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 309, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 310, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 310, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 311, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 311, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 312, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 312, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 313, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20', 313, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 314, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc', 314, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 315, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20', 315, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 316, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+2*hc+coc20+anch20', 316, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '1*hc', 317, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+3*hc+coc20', 317, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 318, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc-coc20', 318, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '0*hc', 319, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc+4*hc', 319, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 320, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 320, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 321, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21', 321, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 322, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21+anch21', 322, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 323, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 323, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 324, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc21', 324, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 325, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 325, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 0, 326, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc21', 326, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 327, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 327, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 328, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 328, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 329, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 329, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 330, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 330, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 331, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc21', 331, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', 'hc', 332, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc21+anch21', 332, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 333, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22', 333, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 334, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 334, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 335, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 335, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 336, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22', 336, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 337, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22+anch22', 337, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 338, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 338, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 339, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 339, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 340, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 340, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '2*hc', 341, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc22', 341, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 342, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 342, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 343, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 343, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 344, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 344, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 345, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 345, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 346, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc22', 346, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '3*hc', 347, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc22+anch22', 347, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 348, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 348, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 349, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 349, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 350, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 350, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 351, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 351, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 352, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23+anch23', 352, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 353, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 353, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 354, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 354, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 355, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 355, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '4*hc', 356, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 356, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 357, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 357, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 358, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 358, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 359, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 359, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 360, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 360, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 361, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc23', 361, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '5*hc', 362, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23+anch23', 362, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 363, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 363, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 364, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 364, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 365, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 365, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 366, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc23', 366, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 367, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc24+anch24', 367, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '7*hc', 368, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc24', 368, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 369, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc23', 369, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '6*hc', 370, 0);
```

```
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc', 370, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '6*hc', 371, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc-coc23', 371, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '7*hc', 372, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+hc+coc24', 372, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 373, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc-coc24', 373, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 374, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc', 374, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 375, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc-coc24', 375, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '7*hc', 376, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+hc+coc24', 376, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '7*hc', 377, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+coc24+anch24', 377, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 378, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+coc24', 378, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 379, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+0', 379, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 380, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+0', 380, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 381, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+coc24', 381, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '9*hc', 382, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+coc25+anch25', 382, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '9*hc', 383, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+hc+coc25', 383, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 384, 0);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc+2*hc-coc24', 384, 1);
model.component('comp1').geom('geom1').feature('wp1').geom.feature('pol1').setIndex('table', '8*hc', 385, 0);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 385, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc', 386, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc24', 386, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 387, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 387, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 388, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 388, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 389, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 389, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 390, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 390, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 391, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 391, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 392, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25+anch25', 392, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 393, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25', 393, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 394, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+0', 394, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 395, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25', 395, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 396, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+coc25+anch25', 396, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '9*hc', 397, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+hc+coc25', 397, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 398, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc-coc25', 398, 1);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '10*hc', 399, 0);
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'pol1').setIndex('table', '8*hc+2*hc', 399, 1);
```

```
    model.component('comp1').geom('geom1').feature('wp1').geom.run('pol
1');

    model.component('comp1').geom('geom1').feature('wp1').geom.run('pol
1');
    model.component('comp1').geom('geom1').feature('wp1').geom.create('
thi1', 'Thicken2D');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'thi1').selection('input').set({'pol1'});
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'thi1').set('totalthick', 'th');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'thi1').set('convexcorner', 'extend');
    model.component('comp1').geom('geom1').feature('wp1').geom.run('thi
1');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'thi1').set('ends', 'circular');
    model.component('comp1').geom('geom1').feature('wp1').geom.run('thi
1');
    model.component('comp1').geom('geom1').feature('wp1').geom.feature(
'thi1').set('convexcorner', 'fillet');
    model.component('comp1').geom('geom1').feature('wp1').geom.run('thi
1');

    model.component('comp1').geom('geom1').feature.create('ext1',
'Extrude');
    model.component('comp1').geom('geom1').feature('ext1').selection('i
nput').set({'wp1'});
    model.component('comp1').geom('geom1').feature('ext1').setIndex('di
stance', 'hi', 0);

    model.component('comp1').geom('geom1').run('ext1');

    model.component('comp1').geom('geom1').create('wp2', 'WorkPlane');
    model.component('comp1').geom('geom1').feature('wp2').set('unite',
true);
    model.component('comp1').geom('geom1').feature('wp2').geom.create('
r1', 'Rectangle');
    model.component('comp1').geom('geom1').feature('wp2').geom.feature(
'r1').set('size', [20 40]);
    model.component('comp1').geom('geom1').feature('wp2').geom.feature(
'r1').set('pos', [-5 15]);
    model.component('comp1').geom('geom1').run('wp2');
    model.component('comp1').geom('geom1').feature.create('ext2',
'Extrude');
    model.component('comp1').geom('geom1').feature('ext2').setIndex('di
stance', '2.63+2.5+2*0.2+3', 0);
    model.component('comp1').geom('geom1').feature('ext2').setIndex('di
stance', '2.63+2.5+2*0.2+3', 0);
    model.component('comp1').geom('geom1').feature('ext2').set('reverse
', true);
    model.component('comp1').geom('geom1').feature('wp2').geom.feature(
'r1').set('pos', [-5 -15]);
    model.component('comp1').geom('geom1').runPre('ext2');
    model.component('comp1').geom('geom1').run('wp2');
    model.component('comp1').geom('geom1').create('cyl1', 'Cylinder');
    model.component('comp1').geom('geom1').feature.move('cyl1', 4);
    model.component('comp1').geom('geom1').feature('cyl1').set('r',
'2.5/2');
```

```
    model.component('comp1').geom('geom1').feature('cyl1').set('h',
40);
    model.component('comp1').geom('geom1').feature('cyl1').set('pos',
[5 -15 -4.08]);
    model.component('comp1').geom('geom1').feature.duplicate('cyl2',
'cyl1');
    model.component('comp1').geom('geom1').feature('cyl2').set('r',
'2.5/2+0.2');
    model.component('comp1').geom('geom1').run('cyl2');
    model.component('comp1').geom('geom1').create('dif1',
'Difference');
    model.component('comp1').geom('geom1').feature('cyl1').set('axistyp
e', 'y');
    model.component('comp1').geom('geom1').feature('cyl2').set('axistyp
e', 'y');
    model.component('comp1').geom('geom1').runPre('dif1');
    model.component('comp1').geom('geom1').feature('dif1').selection('i
nput').set({'cyl2' 'ext2'});
    model.component('comp1').geom('geom1').feature('dif1').selection('i
nput2').set({'cyl1'});
    model.component('comp1').geom('geom1').run('fin');
    model.component('comp1').geom('geom1').run('fin');
    model.component('comp1').geom('geom1').create('boxsel1',
'BoxSelection');
    model.component('comp1').geom('geom1').feature('boxsel1').set('xmin
', '-hc');
    model.component('comp1').geom('geom1').feature('boxsel1').set('xmax
', '11*hc');
    model.component('comp1').geom('geom1').feature('boxsel1').set('ymin
', '-hc');
    model.component('comp1').geom('geom1').feature('boxsel1').set('ymax
', '11*hc');
    model.component('comp1').geom('geom1').feature('boxsel1').set('zmin
', '3*hi/4');
    model.component('comp1').geom('geom1').feature('boxsel1').set('zmax
', '3*hi/2');
    model.component('comp1').geom('geom1').run('boxsel1');
    model.component('comp1').geom('geom1').feature('boxsel1').set('cond
ition', 'inside');
    model.component('comp1').geom('geom1').run('boxsel1');
    model.component('comp1').geom('geom1').feature('boxsel1').label('up
Layer');
    model.component('comp1').geom('geom1').feature.duplicate('boxsel2',
'boxsel1');
    model.component('comp1').geom('geom1').feature('boxsel2').label('gL
ayer');
    model.component('comp1').geom('geom1').feature('boxsel2').set('zmin
', '3*hi/4-hi');
    model.component('comp1').geom('geom1').feature('boxsel2').set('zmax
', 'hi/4');
    model.component('comp1').geom('geom1').run('boxsel2');

    model.component('comp1').geom('geom1').run('boxsel2');
    model.component('comp1').geom('geom1').run('boxsel2');
    model.component('comp1').geom('geom1').run('boxsel1');
    model.component('comp1').geom('geom1').feature('boxsel1').set('enti
tydim', 2);
    model.component('comp1').geom('geom1').feature('boxsel2').set('enti
tydim', 2);
```

```
    model.component('comp1').geom('geom1').run;



    model.component('comp1').geom('geom1').run('boxsel2');
    model.component('comp1').geom('geom1').create('boxsel3',
'BoxSelection');
    model.component('comp1').geom('geom1').feature('boxsel3').set('enti
tydim', 2);
    model.component('comp1').geom('geom1').feature('boxsel3').set('cond
ition', 'inside');
    model.component('comp1').geom('geom1').feature('boxsel3').set('xmin
', -6);
    model.component('comp1').geom('geom1').feature('boxsel3').set('xmax
', -4.5);
    model.component('comp1').geom('geom1').feature('boxsel3').label('fi
xLeft');
    model.component('comp1').geom('geom1').run('boxsel3');
    model.component('comp1').geom('geom1').create('boxsel4',
'BoxSelection');
    model.component('comp1').geom('geom1').feature('boxsel4').set('xmin
', 14.5);
    model.component('comp1').geom('geom1').feature('boxsel4').set('xmax
', 16);
    model.component('comp1').geom('geom1').run('boxsel4');
    model.component('comp1').geom('geom1').feature('boxsel4').set('enti
tydim', 2);
    model.component('comp1').geom('geom1').feature('boxsel4').set('cond
ition', 'inside');
    model.component('comp1').geom('geom1').run('boxsel4');

    model.component('comp1').geom('geom1').feature('boxsel4').label('fi
xRight');
    model.component('comp1').geom('geom1').run('boxsel4');
    model.component('comp1').geom('geom1').create('unisel1',
'UnionSelection');
    model.component('comp1').geom('geom1').feature('unisel1').set('enti
tydim', 2);
    model.component('comp1').geom('geom1').feature('unisel1').set('inpu
t', {'boxsel3' 'boxsel4'});
    model.component('comp1').geom('geom1').feature('unisel1').label('fi
x');
    model.component('comp1').geom('geom1').run('unisel1');

    model.component('comp1').geom('geom1').run('unisel1');
    model.component('comp1').geom('geom1').create('cylsel1',
'CylinderSelection');
    model.component('comp1').geom('geom1').feature('cylsel1').set('enti
tydim', 2);
    model.component('comp1').geom('geom1').feature('cylsel1').set('axis
type', 'y');
    model.component('comp1').geom('geom1').feature('cylsel1').set('pos'
, [5 -15 -4.08]);
    model.component('comp1').geom('geom1').feature('cylsel1').set('r',
'2.5/2+0.2/2');
    model.component('comp1').geom('geom1').feature('cylsel1').set('rin'
, '2.5/2-0.2/2');
    model.component('comp1').geom('geom1').feature('cylsel1').set('cond
ition', 'inside');
```

```
    model.component('comp1').geom('geom1').run('cylsel1');
    model.component('comp1').geom('geom1').feature('cylsel1').label('ve
sselWall');
    model.component('comp1').geom('geom1').run('cylsel1');

    model.component('comp1').geom('geom1').create('boxsel5',
'BoxSelection');
    model.component('comp1').geom('geom1').feature('boxsel5').label('pi
ezo');
    model.component('comp1').geom('geom1').feature('boxsel5').set('xmin
', '-hc');
    model.component('comp1').geom('geom1').feature('boxsel5').set('xmax
', '11*hc');
    model.component('comp1').geom('geom1').feature('boxsel5').set('ymin
', '-hc');
    model.component('comp1').geom('geom1').feature('boxsel5').set('ymax
', '11*hc');
    model.component('comp1').geom('geom1').feature('boxsel5').set('cond
ition', 'inside');
    model.component('comp1').geom('geom1').feature('boxsel5').set('zmin
', '-hi');
    model.component('comp1').geom('geom1').feature('boxsel5').set('zmax
', '2*hi');

    model.component('comp1').geom('geom1').feature.duplicate('boxsel6',
'boxsel5');
    model.component('comp1').geom('geom1').feature('boxsel6').label('sk
in');
    model.component('comp1').geom('geom1').feature('boxsel6').set('xmin
', -10);
    model.component('comp1').geom('geom1').feature('boxsel6').set('xmax
', 20);
    model.component('comp1').geom('geom1').feature('boxsel6').set('ymin
', -20);
    model.component('comp1').geom('geom1').feature('boxsel6').set('ymax
', 30);
    model.component('comp1').geom('geom1').feature('boxsel6').set('zmin
', 'hi/4');
    model.component('comp1').geom('geom1').feature('boxsel6').set('zmax
', 'hi/4');
    model.component('comp1').geom('geom1').feature('boxsel6').set('zmin
', -10);

    model.component('comp1').geom('geom1').create('cylsel2',
'CylinderSelection');
    model.component('comp1').geom('geom1').feature('cylsel2').set('axis
type', 'y');
    model.component('comp1').geom('geom1').feature('cylsel2').set('rin'
, '2.5/2-0.2/2');
    model.component('comp1').geom('geom1').feature('cylsel2').set('r',
'2.5/2+0.2/2');
    model.component('comp1').geom('geom1').feature('cylsel2').set('pos'
, [5 -15 -4.08]);
    model.component('comp1').geom('geom1').feature('cylsel2').label('Ve
ssel');
    model.component('comp1').geom('geom1').feature.move('cylsel2', 16);

    model.component('comp1').geom('geom1').create('difsel1',
'DifferenceSelection');
```

```
    model.component('comp1').geom('geom1').feature('difsel1').set('add'
, {'boxsel6'});
    model.component('comp1').geom('geom1').feature('difsel1').set('subt
ract', {'cylsel2'});
    model.component('comp1').geom('geom1').feature('difsel1').label('on
lySkin');

    model.component('comp1').geom('geom1').feature.move('difsel1', 17);

    model.component('comp1').geom('geom1').create('unisel2',
'UnionSelection');
    model.component('comp1').geom('geom1').feature('unisel2').set('inpu
t', {'boxsel5' 'boxsel6' 'cylsel2' 'difsel1'});

    model.component('comp1').material.create('mat1', 'Common');
    model.component('comp1').material('mat1').propertyGroup.create('Str
ainCharge', 'Strain-charge form');
    model.component('comp1').material('mat1').propertyGroup.create('Str
essCharge', 'Stress-charge form');
    model.component('comp1').material('mat1').label('Polyvinylidene
fluoride (PVDF)');
    model.component('comp1').material('mat1').set('family', 'custom');
    model.component('comp1').material('mat1').set('customambient', [1 1
1]);
    model.component('comp1').material('mat1').set('noise', true);
    model.component('comp1').material('mat1').set('fresnel', 0.99);
    model.component('comp1').material('mat1').set('roughness', 0.02);
    model.component('comp1').material('mat1').set('metallic', 0);
    model.component('comp1').material('mat1').set('pearl', 0);
    model.component('comp1').material('mat1').set('diffusewrap', 0);
    model.component('comp1').material('mat1').set('clearcoat', 0);
    model.component('comp1').material('mat1').set('reflectance', 0);
    model.component('comp1').material('mat1').propertyGroup('def').set(
'relpermittivity', {'7.4' '0' '0' '0' '9.3' '0' '0' '0' '7.6'});
    model.component('comp1').material('mat1').propertyGroup('def').set(
'density', '1780[kg/m^3]');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('sE', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('dET', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('epsilonrT', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_sE', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_dET', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_epsilonT', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('sE', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('dET', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('epsilonrT', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_sE', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_dET', '');
```

```
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_epsilonT', '');
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('sE', {'3.781e-010[1/Pa]' '-1.482e-010[1/Pa]' '-1.724e-
010[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '-1.482e-010[1/Pa]' '3.781e-
10[1/Pa]' '-1.724e-010[1/Pa]' '0[1/Pa]'  ...
    '0[1/Pa]' '0[1/Pa]' '-1.724e-010[1/Pa]' '-1.724e-010[1/Pa]'
'1.092e-9[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]'
...
    '0[1/Pa]' '1.11e-09[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]'
'0[1/Pa]' '0[1/Pa]' '1.11e-09[1/Pa]' '0[1/Pa]'  ...
    '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '0[1/Pa]' '1.428e-
09[1/Pa]'});
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('dET', {'0[C/N]' '0[C/N]' '1.358e-011[C/N]' '0[C/N]' '0[C/N]'
'1.476e-012[C/N]' '0[C/N]' '0[C/N]' '-3.38e-011[C/N]' '0[C/N]'  ...
    '0[C/N]' '0[C/N]' '0[C/N]' '0[C/N]' '0[C/N]' '0[C/N]' '0[C/N]'
'0[C/N]'});
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('epsilonrT', {'7.4' '0' '0' '0' '9.3' '0' '0' '0' '7.74'});
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_sE', {'0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_dET', {'0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').propertyGroup('StrainChar
ge').set('eta_epsilonT', {'0' '0' '0' '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('cE', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eES', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('epsilonrS', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_cE', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_eES', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_epsilonS', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('cE', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eES', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('epsilonrS', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_cE', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_eES', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_epsilonS', '');
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('cE', {'3.8e+09[Pa]' '1.9e+09[Pa]' '0.9e+09[Pa]' '0[Pa]'
'0[Pa]' '0[Pa]' '1.9e+09[Pa]' '3.8e+09[Pa]' '0.9e+09[Pa]' '0[Pa]'  ...
    '0[Pa]' '0[Pa]' '0.9e+09[Pa]' '0.9e+09[Pa]' '1.2e+09[Pa]' '0[Pa]'
'0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]'  ...
```

```
    '0[Pa]' '9e+08[Pa]' '0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]'
'9e+08[Pa]' '0[Pa]'  ...
    '0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]' '0[Pa]' '7e+08[Pa]'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eES', {'0[C/m^2]' '0[C/m^2]' '0.024[C/m^2]' '0[C/m^2]'
'0[C/m^2]' '0.001[C/m^2]' '0[C/m^2]' '0[C/m^2]' '-0.027[C/m^2]'
'0[C/m^2]'  ...
    '0[C/m^2]' '0[C/m^2]' '0[C/m^2]' '0[C/m^2]' '0[C/m^2]' '0[C/m^2]'
'0[C/m^2]' '0[C/m^2]'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('epsilonrS', {'7.4' '0' '0' '0' '9.3' '0' '0' '0' '7.6'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_cE', {'0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_eES', {'0' '0' '0' '0' '0' '0' '0' '0' '0' '0'  ...
    '0' '0' '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').propertyGroup('StressChar
ge').set('eta_epsilonS', {'0' '0' '0' '0' '0' '0' '0' '0' '0'});
    model.component('comp1').material('mat1').set('family', 'custom');
    model.component('comp1').material('mat1').set('lighting',
'cooktorrance');
    model.component('comp1').material('mat1').set('fresnel', 0.99);
    model.component('comp1').material('mat1').set('roughness', 0.02);
    model.component('comp1').material('mat1').set('metallic', 0);
    model.component('comp1').material('mat1').set('pearl', 0);
    model.component('comp1').material('mat1').set('diffusewrap', 0);
    model.component('comp1').material('mat1').set('clearcoat', 0);
    model.component('comp1').material('mat1').set('reflectance', 0);
    model.component('comp1').material('mat1').set('ambient', 'custom');
    model.component('comp1').material('mat1').set('customambient', [1 1
1]);
    model.component('comp1').material('mat1').set('diffuse', 'custom');
    model.component('comp1').material('mat1').set('customdiffuse', [1 1
1]);
    model.component('comp1').material('mat1').set('specular',
'custom');
    model.component('comp1').material('mat1').set('customspecular', [1
1 1]);
    model.component('comp1').material('mat1').set('noisecolor',
'custom');
    model.component('comp1').material('mat1').set('customnoisecolor',
[0 0 0]);
    model.component('comp1').material('mat1').set('noisescale', 0);
    model.component('comp1').material('mat1').set('noise', 'off');
    model.component('comp1').material('mat1').set('noisefreq', 1);
    model.component('comp1').material('mat1').set('normalnoisebrush',
'0');
    model.component('comp1').material('mat1').set('normalnoisetype',
'0');
    model.component('comp1').material('mat1').set('alpha', 1);
    model.component('comp1').material('mat1').selection.set([2]);
    model.component('comp1').material.create('mat2', 'Common');
    model.component('comp1').material('mat2').label('Skin');
    model.component('comp1').material('mat2').propertyGroup('def').set(
'heatcapacity', '3391[J/(kg*K)]');
    model.component('comp1').material('mat2').propertyGroup('def').set(
'density', '1109[kg/m^3]');
```

```
    model.component('comp1').material('mat2').propertyGroup('def').set(
'thermalconductivity', {'0.37[W/(m*K)]' '0' '0' '0' '0.37[W/(m*K)]'
'0' '0' '0' '0.37[W/(m*K)]'});
    model.component('comp1').material('mat2').propertyGroup('def').set(
'frequencyfactor', '4.575e72');
    model.component('comp1').material('mat2').propertyGroup('def').set(
'activationenergy', '4.71e5');
    model.component('comp1').material('mat2').set('family', 'plastic');
    model.component('comp1').material('mat2').selection.set([1]);

    model.component('comp1').material('mat2').propertyGroup.create('Enu
', 'Young''s_modulus_and_Poisson''s_ratio');
    model.component('comp1').material('mat2').propertyGroup('Enu').set(
'E', {'0.1e6'});
    model.component('comp1').material('mat2').propertyGroup('Enu').set(
'nu', {'0.48'});
    model.component('comp1').material.create('mat3', 'Common');
    model.component('comp1').material('mat3').selection.set([3]);
    model.component('comp1').material('mat3').label('vesselWall');
    model.component('comp1').material('mat3').propertyGroup('def').set(
'density', {'1160'});
    model.component('comp1').material('mat3').propertyGroup.create('Enu
', 'Young''s_modulus_and_Poisson''s_ratio');
    model.component('comp1').material('mat3').propertyGroup('Enu').set(
'E', {'0.7e6'});
    model.component('comp1').material('mat3').propertyGroup('Enu').set(
'nu', {'0.49'});


    model.component('comp1').material('mat1').selection.named('geom1_bo
xsel5');
    model.component('comp1').material('mat2').selection.named('geom1_di
fsel1');
    model.component('comp1').material('mat3').selection.named('geom1_cy
lsel2');



    model.component('comp1').physics('solid').feature('pzm1').selection
.set([2]);
    model.component('comp1').physics('es').feature('ccnp1').selection.s
et([2]);
    model.component('comp1').physics('es').selection.set([2]);

    model.component('comp1').probe.create('bnd1', 'Boundary');
    model.component('comp1').probe('bnd1').set('intsurface', true);
    model.component('comp1').probe('bnd1').selection.set([]);

    model.component('comp1').physics('es').create('gnd1', 'Ground', 2);



    model.component('comp1').coordSystem.create('sys2', 'VectorBase');
    model.component('comp1').coordSystem('sys2').set('orthonormal',
true);
```

```
    model.component('comp1').physics('solid').feature('pzm1').set('coor
dinateSystem', 'sys2');
    model.component('comp1').physics('solid').feature('pzm1').set('Cons
titutiveRelation', 'StrainCharge');


    model.component('comp1').probe('bnd1').selection.named('geom1_boxse
l1');
    model.component('comp1').probe('bnd1').set('unit', 'mV');

    model.component('comp1').physics('es').feature('gnd1').selection.na
med('geom1_boxsel2');

    model.component('comp1').physics('solid').create('fix1', 'Fixed',
2);
    model.component('comp1').physics('solid').feature('fix1').selection
.set([]);
    model.component('comp1').physics('solid').feature('fix1').selection
.named('geom1_unisel1');

    model.component('comp1').physics('solid').create('bndl1',
'BoundaryLoad', 2);
    model.component('comp1').physics('solid').feature('bndl1').selectio
n.named('geom1_cylsel1');
    model.component('comp1').physics('solid').feature('bndl1').set('Loa
dType', 'FollowerPressure');
    model.component('comp1').physics('solid').feature('bndl1').set('Fol
lowerPressure', 'pp');

    model.component('comp1').physics('es').selection.named('geom1_boxse
l5');
    model.component('comp1').physics('es').feature('ccnp1').selection.n
amed('geom1_boxsel5');
    model.component('comp1').physics('solid').selection.named('geom1_un
isel2');
    model.component('comp1').physics('solid').feature('pzm1').selection
.named('geom1_boxsel5');

    model.component('comp1').mesh('mesh1').automatic(false);
    model.component('comp1').mesh('mesh1').feature.remove('ftet1');
    model.component('comp1').mesh('mesh1').create('ftet1', 'FreeTet');
    model.component('comp1').mesh('mesh1').feature('ftet1').selection.g
eom('geom1', 3);
    model.component('comp1').mesh('mesh1').feature('ftet1').selection.n
amed('geom1_boxsel5');
    model.component('comp1').mesh('mesh1').feature('ftet1').create('siz
e1', 'Size');
    model.component('comp1').mesh('mesh1').feature('ftet1').feature('si
ze1').set('custom', true);
    model.component('comp1').mesh('mesh1').feature('ftet1').feature('si
ze1').set('hmaxactive', true);
    model.component('comp1').mesh('mesh1').feature('ftet1').feature('si
ze1').set('hmax', 0.1);
    model.component('comp1').mesh('mesh1').feature('ftet1').feature('si
ze1').set('hminactive', true);
    model.component('comp1').mesh('mesh1').feature('ftet1').feature('si
ze1').set('hmin', 0.005);
    model.component('comp1').mesh('mesh1').create('ftet2', 'FreeTet');
```

```
    model.component('comp1').mesh('mesh1').feature('ftet2').selection.g
eom('geom1', 3);
    model.component('comp1').mesh('mesh1').feature('ftet2').selection.n
amed('geom1_difsel1');
    model.component('comp1').mesh('mesh1').create('ftet3', 'FreeTet');
    model.component('comp1').mesh('mesh1').feature('ftet3').selection.g
eom('geom1', 3);
    model.component('comp1').mesh('mesh1').feature('ftet3').selection.n
amed('geom1_cylsel2');
    model.component('comp1').mesh('mesh1').run('ftet3');


    model.sol.create('sol1');
    model.sol('sol1').study('std1');

    model.study('std1').feature('stat').set('notlistsolnum', 1);
    model.study('std1').feature('stat').set('notsolnum', 'auto');
    model.study('std1').feature('stat').set('listsolnum', 1);
    model.study('std1').feature('stat').set('solnum', 'auto');

    model.sol('sol1').create('st1', 'StudyStep');
    model.sol('sol1').feature('st1').set('study', 'std1');
    model.sol('sol1').feature('st1').set('studystep', 'stat');
    model.sol('sol1').create('v1', 'Variables');
    model.sol('sol1').feature('v1').set('control', 'stat');
    model.sol('sol1').create('s1', 'Stationary');
    model.sol('sol1').feature('s1').feature('aDef').set('cachepattern',
true);
    model.sol('sol1').feature('s1').create('seDef', 'Segregated');
    model.sol('sol1').feature('s1').create('fc1', 'FullyCoupled');
    model.sol('sol1').feature('s1').feature('fc1').set('termonres',
'auto');
    model.sol('sol1').feature('s1').feature('fc1').set('reserrfact',
1000);
    model.sol('sol1').feature('s1').create('d1', 'Direct');
    model.sol('sol1').feature('s1').feature('d1').set('linsolver',
'pardiso');
    model.sol('sol1').feature('s1').feature('d1').set('pivotperturb',
1.0E-9);
    model.sol('sol1').feature('s1').feature('d1').label('Suggested
Direct Solver (pze1) (merged)');
    model.sol('sol1').feature('s1').create('i1', 'Iterative');
    model.sol('sol1').feature('s1').feature('i1').set('linsolver',
'gmres');
    model.sol('sol1').feature('s1').feature('i1').set('rhob', 400);
    model.sol('sol1').feature('s1').feature('i1').set('nlinnormuse',
true);
    model.sol('sol1').feature('s1').feature('i1').label('Suggested
Iterative Solver (pze1)');
    model.sol('sol1').feature('s1').feature('i1').create('mg1',
'Multigrid');
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').set('p
refun', 'gmg');
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('pr').create('so1', 'SOR');
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('pr').feature('so1').set('relax', 0.8);
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('po').create('so1', 'SOR');
```

```
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('po').feature('sol').set('relax', 0.8);
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('cs').create('d1', 'Direct');
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('cs').feature('d1').set('linsolver', 'pardiso');
    model.sol('sol1').feature('s1').feature('i1').feature('mg1').featur
e('cs').feature('d1').set('pivotperturb', 1.0E-9);
    model.sol('sol1').feature('s1').feature('fc1').set('linsolver',
'd1');
    model.sol('sol1').feature('s1').feature('fc1').set('termonres',
'auto');
    model.sol('sol1').feature('s1').feature('fc1').set('reserrfact',
1000);
    model.sol('sol1').feature('s1').feature.remove('fcDef');
    model.sol('sol1').feature('s1').feature.remove('seDef');
    model.sol('sol1').attach('std1');

    model.result.create('pg1', 'PlotGroup3D');
    model.result('pg1').label('Electric Potential (es)');
    model.result('pg1').set('frametype', 'spatial');
    model.result('pg1').set('showlegendsmaxmin', true);
    model.result('pg1').set('data', 'dset1');
    model.result('pg1').feature.create('mslc1', 'Multislice');
    model.result('pg1').feature('mslc1').set('showsolutionparams',
'on');
    model.result('pg1').feature('mslc1').set('solutionparams',
'parent');
    model.result('pg1').feature('mslc1').set('multiplanexmethod',
'coord');
    model.result('pg1').feature('mslc1').set('xcoord', 'es.CPx');
    model.result('pg1').feature('mslc1').set('multiplaneymethod',
'coord');
    model.result('pg1').feature('mslc1').set('ycoord', 'es.CPy');
    model.result('pg1').feature('mslc1').set('multiplanezmethod',
'coord');
    model.result('pg1').feature('mslc1').set('zcoord', 'es.CPz');
    model.result('pg1').feature('mslc1').set('colortable', 'Dipole');
    model.result('pg1').feature('mslc1').set('showsolutionparams',
'on');
    model.result('pg1').feature('mslc1').set('data', 'parent');
    model.result('pg1').feature.create('strmsl1',
'StreamlineMultislice');
    model.result('pg1').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg1').feature('strmsl1').set('solutionparams',
'parent');
    model.result('pg1').feature('strmsl1').set('multiplanexmethod',
'coord');
    model.result('pg1').feature('strmsl1').set('xcoord', 'es.CPx');
    model.result('pg1').feature('strmsl1').set('multiplaneymethod',
'coord');
    model.result('pg1').feature('strmsl1').set('ycoord', 'es.CPy');
    model.result('pg1').feature('strmsl1').set('multiplanezmethod',
'coord');
    model.result('pg1').feature('strmsl1').set('zcoord', 'es.CPz');
    model.result('pg1').feature('strmsl1').set('titletype', 'none');
    model.result('pg1').feature('strmsl1').set('posmethod', 'uniform');
    model.result('pg1').feature('strmsl1').set('udist', 0.02);
```

```
    model.result('pg1').feature('strmsl1').set('maxlen', 0.4);
    model.result('pg1').feature('strmsl1').set('maxtime', Inf);
    model.result('pg1').feature('strmsl1').set('inheritcolor', false);
    model.result('pg1').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg1').feature('strmsl1').set('maxtime', Inf);
    model.result('pg1').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg1').feature('strmsl1').set('maxtime', Inf);
    model.result('pg1').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg1').feature('strmsl1').set('maxtime', Inf);
    model.result('pg1').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg1').feature('strmsl1').set('maxtime', Inf);
    model.result('pg1').feature('strmsl1').set('data', 'parent');
    model.result('pg1').feature('strmsl1').set('inheritplot', 'mslc1');
    model.result('pg1').feature('strmsl1').feature.create('col1',
'Color');
    model.result('pg1').feature('strmsl1').feature('col1').set('colorta
ble', 'DipoleDark');
    model.result('pg1').feature('strmsl1').feature('col1').set('colorle
gend', false);
    model.result('pg1').feature('strmsl1').feature.create('filt1',
'Filter');
    model.result('pg1').feature('strmsl1').feature('filt1').set('expr',
'!isScalingSystemDomain');
    model.result.create('pg2', 'PlotGroup3D');
    model.result('pg2').label('Electric Field Norm (es)');
    model.result('pg2').set('frametype', 'spatial');
    model.result('pg2').set('showlegendsmaxmin', true);
    model.result('pg2').set('data', 'dset1');
    model.result('pg2').feature.create('mslc1', 'Multislice');
    model.result('pg2').feature('mslc1').set('showsolutionparams',
'on');
    model.result('pg2').feature('mslc1').set('solutionparams',
'parent');
    model.result('pg2').feature('mslc1').set('expr', 'es.normE');
    model.result('pg2').feature('mslc1').set('multiplanexmethod',
'coord');
    model.result('pg2').feature('mslc1').set('xcoord', 'es.CPx');
    model.result('pg2').feature('mslc1').set('multiplaneymethod',
'coord');
    model.result('pg2').feature('mslc1').set('ycoord', 'es.CPy');
    model.result('pg2').feature('mslc1').set('multiplanezmethod',
'coord');
    model.result('pg2').feature('mslc1').set('zcoord', 'es.CPz');
    model.result('pg2').feature('mslc1').set('colortable', 'Prism');
    model.result('pg2').feature('mslc1').set('colortabletrans',
'nonlinear');
    model.result('pg2').feature('mslc1').set('colorcalibration', -0.8);
    model.result('pg2').feature('mslc1').set('showsolutionparams',
'on');
    model.result('pg2').feature('mslc1').set('data', 'parent');
    model.result('pg2').feature.create('strmsl1',
'StreamlineMultislice');
    model.result('pg2').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg2').feature('strmsl1').set('solutionparams',
'parent');
```

```
    model.result('pg2').feature('strmsl1').set('multiplanexmethod',
'coord');
    model.result('pg2').feature('strmsl1').set('xcoord', 'es.CPx');
    model.result('pg2').feature('strmsl1').set('multiplaneymethod',
'coord');
    model.result('pg2').feature('strmsl1').set('ycoord', 'es.CPy');
    model.result('pg2').feature('strmsl1').set('multiplanezmethod',
'coord');
    model.result('pg2').feature('strmsl1').set('zcoord', 'es.CPz');
    model.result('pg2').feature('strmsl1').set('titletype', 'none');
    model.result('pg2').feature('strmsl1').set('posmethod', 'uniform');
    model.result('pg2').feature('strmsl1').set('udist', 0.02);
    model.result('pg2').feature('strmsl1').set('maxlen', 0.4);
    model.result('pg2').feature('strmsl1').set('maxtime', Inf);
    model.result('pg2').feature('strmsl1').set('inheritcolor', false);
    model.result('pg2').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg2').feature('strmsl1').set('maxtime', Inf);
    model.result('pg2').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg2').feature('strmsl1').set('maxtime', Inf);
    model.result('pg2').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg2').feature('strmsl1').set('maxtime', Inf);
    model.result('pg2').feature('strmsl1').set('showsolutionparams',
'on');
    model.result('pg2').feature('strmsl1').set('maxtime', Inf);
    model.result('pg2').feature('strmsl1').set('data', 'parent');
    model.result('pg2').feature('strmsl1').set('inheritplot', 'mslc1');
    model.result('pg2').feature('strmsl1').feature.create('col1',
'Color');
    model.result('pg2').feature('strmsl1').feature('col1').set('expr',
'es.normE');
    model.result('pg2').feature('strmsl1').feature('col1').set('colorta
ble', 'PrismDark');
    model.result('pg2').feature('strmsl1').feature('col1').set('colorle
gend', false);
    model.result('pg2').feature('strmsl1').feature('col1').set('colorta
bletrans', 'nonlinear');
    model.result('pg2').feature('strmsl1').feature('col1').set('colorca
libration', -0.8);
    model.result('pg2').feature('strmsl1').feature.create('filt1',
'Filter');
    model.result('pg2').feature('strmsl1').feature('filt1').set('expr',
'!isScalingSystemDomain');
    model.result.create('pg3', 'PlotGroup3D');
    model.result('pg3').set('data', 'dset1');
    model.result('pg3').set('frametype', 'spatial');
    model.result('pg3').create('vol1', 'Volume');
    model.result('pg3').feature('vol1').set('expr', {'solid.mises'});
    model.result('pg3').feature('vol1').set('threshold', 'manual');
    model.result('pg3').feature('vol1').set('thresholdvalue', 0.2);
    model.result('pg3').feature('vol1').set('resolution', 'custom');
    model.result('pg3').feature('vol1').set('refine', 2);
    model.result('pg3').label('Stress (solid)');
    model.result('pg3').feature('vol1').set('colortable', 'Prism');
    model.result('pg3').feature('vol1').create('def', 'Deform');
    model.result('pg3').feature('vol1').feature('def').set('expr', {'u'
'v' 'w'});
```

```
    model.result('pg3').feature('vol1').feature('def').set('descr',
'Displacement field');

    model.nodeGroup.create('dset1solidlgrp', 'Results');
    model.nodeGroup('dset1solidlgrp').label('Applied Loads (solid)');
    model.nodeGroup('dset1solidlgrp').set('type', 'plotgroup');
    model.nodeGroup('dset1solidlgrp').placeAfter('plotgroup', 'pg3');
    model.nodeGroup.move('dset1solidlgrp', 0);

    model.result.create('pg4', 'PlotGroup3D');
    model.result('pg4').set('data', 'dset1');
    model.result('pg4').label('Boundary Loads (solid)');

    model.nodeGroup('dset1solidlgrp').add('plotgroup', 'pg4');

    model.result('pg4').set('showlegends', true);
    model.result('pg4').set('titletype', 'label');
    model.result('pg4').set('frametype', 'spatial');
    model.result('pg4').set('showlegendsunit', true);
    model.result('pg4').create('surf1', 'Surface');
    model.result('pg4').feature('surf1').set('expr', {'1'});
    model.result('pg4').feature('surf1').label('Gray Surfaces');
    model.result('pg4').feature('surf1').set('coloring', 'uniform');
    model.result('pg4').feature('surf1').set('color', 'gray');
    model.result('pg4').feature('surf1').create('sel1', 'Selection');

    model.result('pg4').feature('surf1').create('tran1',
'Transparency');
    model.result('pg4').feature('surf1').feature('tran1').set('transpar
ency', 0.8);
    model.result('pg4').create('arws1', 'ArrowSurface');
    model.result('pg4').feature('arws1').set('expr',
{'solid.bndl1.F_Ax' 'solid.bndl1.F_Ay' 'solid.bndl1.F_Az'});
    model.result('pg4').feature('arws1').set('placement',
'gausspoints');
    model.result('pg4').feature('arws1').set('arrowbase', 'head');
    model.result('pg4').feature('arws1').label('Boundary Load 1');
    model.result('pg4').feature.move('surf1', 1);
    model.result('pg4').feature('arws1').set('inheritplot', 'none');
    model.result('pg4').feature('arws1').create('col', 'Color');
    model.result('pg4').feature('arws1').feature('col').set('expr',
'solid.bndl1.F_A_Mag');
    model.result('pg4').feature('arws1').feature('col').set('coloring',
'gradient');
    model.result('pg4').feature('arws1').feature('col').set('topcolor',
'red');
    model.result('pg4').feature('arws1').feature('col').set('bottomcolo
r', 'custom');
    model.result('pg4').feature('arws1').feature('col').set('custombott
omcolor', [0.5882353186607361 0.5137255191802979 0.5176470875740051]);
    model.result('pg4').feature('arws1').set('color', 'red');

    model.component('comp1').probe('bnd1').genResult('none');

    model.sol('sol1').runAll;

    figure(2)
```

```
    model.result.create('pg6', 'PlotGroup1D');
    model.result('pg6').create('tblp1', 'Table');
    model.result('pg6').feature('tblp1').set('transform', 'none');
    model.result('pg6').feature('tblp1').set('plotcolumninput',
'manual');
    model.result('pg6').feature('tblp1').set('plotcolumns', [1]);
    model.result('pg6').run;

    v = mphplot(model, 'pg6');

    Voltage = -max(v{1,1}{1,1}.d);
```

Bayesian Optimization Framework – MATLAB

```
    clear;
    clc;


    var1 = optimizableVariable('angle', [-30, 30], 'Type', 'integer');
    var2 = optimizableVariable('M', [-10, 10], 'Type', 'integer');
    var3 = optimizableVariable('N', [-1, 1], 'Type', 'integer');



    fun = @(x) SkinAddedCode( x.angle, x.M, x.N);

    var = [ var1, var2, var3];

    results = bayesopt(fun, var, 'MaxObj',50);
```

Machine Learning Regression Models – Python

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset = pd.read_csv('Data.csv')
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =
0.2, random_state = 0)

from sklearn.preprocessing import PolynomialFeatures
from sklearn.linear_model import LinearRegression
poly_reg = PolynomialFeatures(degree = 4)
X_poly = poly_reg.fit_transform(X_train)
```

```
regressor = LinearRegression()
regressor.fit(X_poly, y_train)

y_pred = regressor.predict(poly_reg.transform(X_test))
np.set_printoptions(precision=2)
print(np.concatenate((y_pred.reshape(len(y_pred),1),
y_test.reshape(len(y_test),1)),1))

from sklearn.metrics import r2_score
r2_score(y_test, y_pred)

x = np.linspace(700, 1000)
y = x
plt.plot(x, y,  color = 'red')
plt.scatter(y_test, y_pred, color = 'blue', marker = '.')
plt.xlabel('Actual Values ')
plt.ylabel('Predictions ')
plt.axis('equal')
plt.axis('square')

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset = pd.read_csv('Data.csv')
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values

y = y.reshape(len(y),1)

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =
0.2, random_state = 0)

from sklearn.preprocessing import StandardScaler
sc_X = StandardScaler()
sc_y = StandardScaler()
X_train = sc_X.fit_transform(X_train)
y_train = sc_y.fit_transform(y_train)
```

```
from sklearn.svm import SVR
regressor = SVR(kernel = 'rbf')
regressor.fit(X_train, y_train)

y_pred =
sc_y.inverse_transform(regressor.predict(sc_X.transform(X_test)).resha
pe(-1,1))
np.set_printoptions(precision=2)
print(np.concatenate((y_pred.reshape(len(y_pred),1),
y_test.reshape(len(y_test),1)),1))

from sklearn.metrics import r2_score
r2_score(y_test, y_pred)

x = np.linspace(700, 1000)
y = x
plt.plot(x, y,  color = 'red')
plt.scatter(y_test, y_pred, color = 'blue', marker = '.')
plt.xlabel('Actual Values ')
plt.ylabel('Predictions ')
plt.axis('equal')
plt.axis('square')

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset = pd.read_csv('Data.csv')
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =
0.2, random_state = 0)

from sklearn.tree import DecisionTreeRegressor
regressor = DecisionTreeRegressor(random_state = 0)
regressor.fit(X_train, y_train)

y_pred = regressor.predict(X_test)
```

```
np.set_printoptions(precision=2)
print(np.concatenate((y_pred.reshape(len(y_pred),1),
y_test.reshape(len(y_test),1)),1))

from sklearn.metrics import r2_score
r2_score(y_test, y_pred)

x = np.linspace(700, 1000)
y = x
plt.plot(x, y,  color = 'red')
plt.scatter(y_test, y_pred, color = 'blue', marker = '.')
plt.xlabel('Actual Values ')
plt.ylabel('Predictions ')
plt.axis('equal')
plt.axis('square')

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset = pd.read_csv('Data.csv')
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =
0.2, random_state = 0)

from sklearn.ensemble import RandomForestRegressor
regressor = RandomForestRegressor(n_estimators = 10, random_state = 0)
regressor.fit(X_train, y_train)

y_pred = regressor.predict(X_test)
np.set_printoptions(precision=2)
print(np.concatenate((y_pred.reshape(len(y_pred),1),
y_test.reshape(len(y_test),1)),1))

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