### Лабораторная работа №2

## Тема: Каркасная визуализация выпуклого многогранника. Удаление невидимых линий.

Черных Сергей М8О-305Б-20

Вариант: Правильный октаэдр

Разработать формат представления многогранника и процедуру его каркасной отрисовки в ортографической и изометрической проекциях. Обеспечить удаление невидимых линий и возможность пространственных поворотов и масштабирования многогранника. Обеспечить автоматическое центрирование и изменение размеров изображения при изменении размеров окна.

import plotly.graph\_objects as go  
import plotly.express as px  
import numpy as np  
from math import sqrt  
  
vertices = np.array([  
 ( 1, 0, 0),  
 ( 0, 1, 0),  
 ( 0, 0, 1/sqrt(2)),  
 (-1, 0, 0),  
 (0, -1, 0),  
 ( 0, 0, -1/sqrt(2))  
 ]  
)  
  
faces = np.array([  
 (0, 1, 2),  
 (1, 3, 2),  
 (3, 4, 2),  
 (4, 0, 2),  
 (0, 5, 1),  
 (1, 5, 3),  
 (3, 5, 4),  
 (4, 5, 0)  
 ]  
)  
  
def plot\_3d(a=1):  
  
 fig = go.Figure(data=[  
 go.Mesh3d(  
 x=a\*vertices[:,0],  
 y=a\*vertices[:,1],  
 z=a\*vertices[:,2],  
  
 intensity=np.linalg.norm(vertices, axis=1),  
 colorscale=[(0.0, 'rgb(0, 0, 55)'), (1.0, 'rgb(0, 0, 175)'),],  
 i=faces[:,0],  
 j=faces[:,1],  
 k=faces[:,2],  
 name='y',  
 showscale=False,  
 flatshading=True,  
 )  
 ])  
  
 fig.update\_layout(  
 autosize=False,  
 width=600,  
 height=600,  
 margin=dict(  
 l=10,  
 r=10,  
 b=10,  
 t=80,  
 pad=5  
 ),  
 paper\_bgcolor="silver",  
 title\_text = "Октаэдр",  
 )  
  
 fig.show()  
  
def plot\_XOY(a=1):  
 x = a \* np.array([vertices[0, 0], vertices[1, 0], vertices[3, 0], vertices[4, 0], vertices[0, 0]])  
 y = a \* np.array([vertices[0, 1], vertices[1, 1], vertices[3, 1], vertices[4, 1], vertices[0, 1]])  
 fig = go.Figure(go.Scatter(x=x, y=y, fill="toself", fillcolor = 'rgba(0, 0, 175, 1)'))  
 fig.update\_layout(  
 autosize=False,  
 margin=dict(  
 l=10,  
 r=10,  
 b=10,  
 t=50,  
 pad=1  
 ),  
 paper\_bgcolor="silver",  
 title\_text='XOY'  
 )  
 fig.update\_yaxes(  
 scaleanchor = "x",  
 scaleratio = 1,  
 )  
 fig.show()  
  
def plot\_XOZ(a=1):  
 x = a \* np.array([vertices[0, 0], vertices[2, 0], vertices[3, 0], vertices[5, 0], vertices[0, 0]])  
 z = a \* np.array([vertices[0, 2], vertices[2, 2], vertices[3, 2], vertices[5, 2], vertices[0, 2]])  
 fig = go.Figure(go.Scatter(x=x, y=z, fill="toself", fillcolor = 'rgba(0, 0, 175, 1)'))  
 fig.update\_layout(  
 autosize=False,  
 margin=dict(  
 l=10,  
 r=10,  
 b=10,  
 t=50,  
 pad=1  
 ),  
 paper\_bgcolor="silver",  
 title\_text='XOZ'  
 )  
 fig.update\_yaxes(  
 scaleanchor = "x",  
 scaleratio = 1,  
 )  
 fig.show()  
  
def plot\_YOZ(a=1):  
 y = a \* np.array([vertices[1, 1], vertices[2, 1], vertices[4, 1], vertices[5, 1], vertices[1, 1]])  
 z = a \* np.array([vertices[1, 2], vertices[2, 2], vertices[4, 2], vertices[5, 2], vertices[1, 2]])  
 fig = go.Figure(go.Scatter(x=y, y=z, fill="toself", fillcolor = 'rgba(0, 0, 175, 1)'))  
 fig.update\_layout(  
 autosize=False,  
 margin=dict(  
 l=10,  
 r=10,  
 b=10,  
 t=50,  
 pad=1  
 ),  
 paper\_bgcolor="silver",  
 title\_text='YOZ'  
 )  
 fig.update\_yaxes(  
 scaleanchor = "x",  
 scaleratio = 1,  
 )  
   
 fig.show()  
def plot\_3dlines(a=1):  
 vertices = np.array([  
 ( 0, 0, 1/sqrt(2)),  
 ( 1, 0, 0),  
 ( 0, 0, 1/sqrt(2)),  
 ( 0, 1, 0),  
 ( 0, 0, 1/sqrt(2)),  
 (-1, 0, 0),  
 ( 0, 0, 1/sqrt(2)),  
 (0, -1, 0),  
  
 ( 1, 0, 0),  
 ( 0, 1, 0),  
 (-1, 0, 0),  
 (0, -1, 0),  
  
 ( 0, 0, -1/sqrt(2)),  
 (-1, 0, 0),  
 ( 0, 0, -1/sqrt(2)),  
 ( 0, 1, 0),  
 ( 0, 0, -1/sqrt(2)),  
 ( 1, 0, 0),  
 ]  
 )  
 fig = go.Figure(data=go.Scatter3d(  
 x=a\*vertices[:,0],  
 y=a\*vertices[:,1],  
 z=a\*vertices[:,2],  
 marker=dict(  
 color='LightSkyBlue',  
 size=1,  
 ),  
 line=dict(  
 color='darkblue',  
 width=2  
 )  
 )  
 )  
 fig.update\_layout(  
 autosize=False,  
 width=600,  
 height=600,  
 margin=dict(  
 l=10,  
 r=10,  
 b=10,  
 t=80,  
 pad=5  
 ),  
 paper\_bgcolor="silver",  
 title\_text = "Октаэдр",  
 )  
 fig.show()  
   
def plot\_all(a=1):  
 plot\_3d(a)  
 plot\_3dlines(a)  
 plot\_XOY(a)  
 plot\_XOZ(a)  
 plot\_YOZ(a)  
 plot\_3dlines(a)

Введите длину стороны а

a = 1

plot\_all(a)

{"layout":{"height":600,"autosize":false,"width":600,"margin":{"l":10,"pad":5,"t":80,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"Октаэдр"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"j":[1,3,4,0,5,5,5,5],"z":[0,0,0.7071067811865475,0,0,-0.7071067811865475],"showscale":false,"k":[2,2,2,2,1,3,4,0],"flatshading":true,"opacity":0.75,"name":"y","intensity":[1,1,0.7071067811865475,1,1,0.7071067811865475],"colorscale":[[0,"rgb(0, 0, 55)"],[1,"rgb(0, 0, 175)"]],"x":[1,0,0,-1,0,0],"type":"mesh3d","i":[0,1,3,4,0,1,3,4],"y":[0,1,0,0,-1,0]}]}

{"layout":{"height":600,"autosize":false,"width":600,"margin":{"l":10,"pad":5,"t":80,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"Октаэдр"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"z":[0.7071067811865475,0,0.7071067811865475,0,0.7071067811865475,0,0.7071067811865475,0,0,0,0,0,-0.7071067811865475,0,-0.7071067811865475,0,-0.7071067811865475,0],"line":{"color":"darkblue","width":2},"marker":{"color":"LightSkyBlue","size":1},"x":[0,1,0,0,0,-1,0,0,1,0,-1,0,0,-1,0,0,0,1],"type":"scatter3d","y":[0,0,0,1,0,0,0,-1,0,1,0,-1,0,0,0,1,0,0]}]}

{"layout":{"autosize":false,"yaxis":{"scaleanchor":"x","scaleratio":1},"margin":{"l":10,"pad":1,"t":50,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"XOY"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"fillcolor":"rgba(0, 0, 175, 1)","fill":"toself","x":[1,0,-1,0,1],"type":"scatter","y":[0,1,0,-1,0]}]}

{"layout":{"autosize":false,"yaxis":{"scaleanchor":"x","scaleratio":1},"margin":{"l":10,"pad":1,"t":50,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"XOZ"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"fillcolor":"rgba(0, 0, 175, 1)","fill":"toself","x":[1,0,-1,0,1],"type":"scatter","y":[0,0.7071067811865475,0,-0.7071067811865475,0]}]}

{"layout":{"autosize":false,"yaxis":{"scaleanchor":"x","scaleratio":1},"margin":{"l":10,"pad":1,"t":50,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"YOZ"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"fillcolor":"rgba(0, 0, 175, 1)","fill":"toself","x":[1,0,-1,0,1],"type":"scatter","y":[0,0.7071067811865475,0,-0.7071067811865475,0]}]}

{"layout":{"height":600,"autosize":false,"width":600,"margin":{"l":10,"pad":5,"t":80,"b":10,"r":10},"paper\_bgcolor":"silver","title":{"text":"Октаэдр"},"template":{"layout":{"annotationdefaults":{"arrowwidth":1,"arrowhead":0,"arrowcolor":"#2a3f5f"},"yaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"hovermode":"closest","hoverlabel":{"align":"left"},"polar":{"bgcolor":"#E5ECF6","angularaxis":{"gridcolor":"white","linecolor":"white","ticks":""},"radialaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"xaxis":{"zerolinecolor":"white","zerolinewidth":2,"gridcolor":"white","title":{"standoff":15},"linecolor":"white","ticks":"","automargin":true},"coloraxis":{"colorbar":{"outlinewidth":0,"ticks":""}},"paper\_bgcolor":"white","ternary":{"bgcolor":"#E5ECF6","caxis":{"gridcolor":"white","linecolor":"white","ticks":""},"baxis":{"gridcolor":"white","linecolor":"white","ticks":""},"aaxis":{"gridcolor":"white","linecolor":"white","ticks":""}},"shapedefaults":{"line":{"color":"#2a3f5f"}},"autotypenumbers":"strict","colorway":["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692","#B6E880","#FF97FF","#FECB52"],"geo":{"subunitcolor":"white","bgcolor":"white","showlakes":true,"lakecolor":"white","showland":true,"landcolor":"#E5ECF6"},"colorscale":{"sequentialminus":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"diverging":[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],[0.8,"#7fbc41"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"plot\_bgcolor":"#E5ECF6","title":{"x":5.0e-2},"font":{"color":"#2a3f5f"},"scene":{"yaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"xaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2},"zaxis":{"backgroundcolor":"#E5ECF6","zerolinecolor":"white","gridcolor":"white","showbackground":true,"linecolor":"white","ticks":"","gridwidth":2}},"mapbox":{"style":"light"}},"data":{"mesh3d":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"mesh3d"}],"scattercarpet":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattercarpet"}],"heatmapgl":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmapgl"}],"parcoords":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"parcoords"}],"histogram2dcontour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2dcontour"}],"contour":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"contour"}],"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"histogram2d"}],"barpolar":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"barpolar"}],"carpet":[{"baxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"aaxis":{"minorgridcolor":"white","endlinecolor":"#2a3f5f","gridcolor":"white","startlinecolor":"#2a3f5f","linecolor":"white"},"type":"carpet"}],"heatmap":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"heatmap"}],"pie":[{"type":"pie","automargin":true}],"choropleth":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"choropleth"}],"contourcarpet":[{"colorbar":{"outlinewidth":0,"ticks":""},"type":"contourcarpet"}],"scattermapbox":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattermapbox"}],"scattergl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergl"}],"scatterpolargl":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolargl"}],"surface":[{"colorbar":{"outlinewidth":0,"ticks":""},"colorscale":[[0,"#0d0887"],[0.1111111111111111,"#46039f"],[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"type":"surface"}],"histogram":[{"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"}},"type":"histogram"}],"scattergeo":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scattergeo"}],"scatter":[{"fillpattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"type":"scatter"}],"table":[{"cells":{"line":{"color":"white"},"fill":{"color":"#EBF0F8"}},"header":{"line":{"color":"white"},"fill":{"color":"#C8D4E3"}},"type":"table"}],"scatterpolar":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterpolar"}],"scatterternary":[{"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatterternary"}],"bar":[{"error\_y":{"color":"#2a3f5f"},"error\_x":{"color":"#2a3f5f"},"marker":{"pattern":{"size":10,"solidity":0.2,"fillmode":"overlay"},"line":{"color":"#E5ECF6","width":0.5}},"type":"bar"}],"scatter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":""}},"marker":{"colorbar":{"outlinewidth":0,"ticks":""}},"type":"scatter3d"}]}}},"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"z":[0.7071067811865475,0,0.7071067811865475,0,0.7071067811865475,0,0.7071067811865475,0,0,0,0,0,-0.7071067811865475,0,-0.7071067811865475,0,-0.7071067811865475,0],"line":{"color":"darkblue","width":2},"marker":{"color":"LightSkyBlue","size":1},"x":[0,1,0,0,0,-1,0,0,1,0,-1,0,0,-1,0,0,0,1],"type":"scatter3d","y":[0,0,0,1,0,0,0,-1,0,1,0,-1,0,0,0,1,0,0]}]}