DEMO_0008_Gyroid_Cylindrical_Arrangment

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This is a demo for:

- Building geometry for TPMS structures by arranging cells in cylindrical coordinates.

1. case-1: Gyroid cylindrical arrangement, half cylinder.

2. case-2: Gyroid cylindrical arrangement, full cylinder.

3. case-3: Gyroid cylindrical arrangement, shell cylinder.

Name

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```
Change log:
2023/11/15 MV Created
2024/02/1 MV Added Examples 1 & 2
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```

```
clear; close all; clc;
```

Plot settings

```
fontSize=20;
faceAlpha1=0.8;
markerSize=10;
lineWidth1=3;
lineWidth2=4;
markerSize1=25;
```

Control parameters

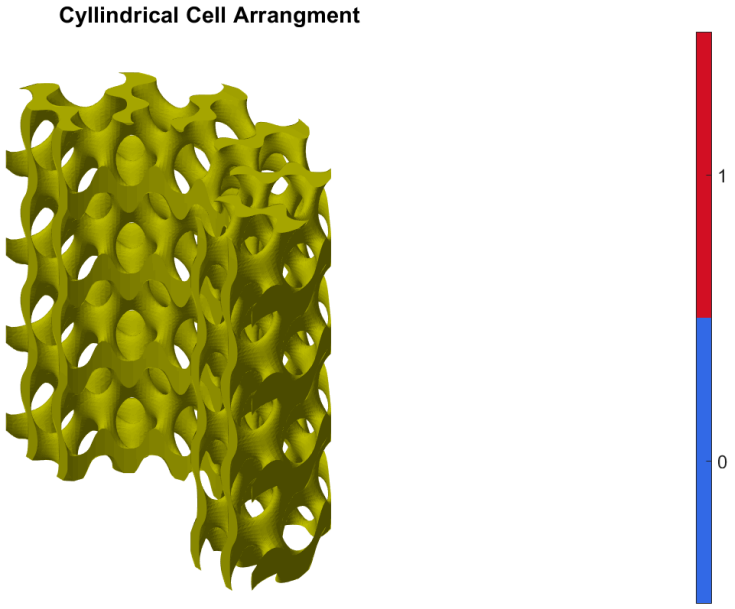
```
res=100; %Resolution

inputCase=3; % 1: Figure-8(a), 2: Figure-8(b), 3: Figure-8(c)
```

Compute gyroid sample in cilyndrical arrangment

```
switch inputCase %structure size
    case 1 %Figure-8(a)
        inputStruct.size=[0, 2, 1*pi, 2];
    case 2 %Figure-8(b)
        inputStruct.size = [0, 2, 2*pi, 2];
    case 3 %Figure-8(c)
        inputStruct.size = [1, 2, 1*pi, 2];
end

inputStruct.Ns=res; % number of sampling points
inputStruct.isocap=1; %Option to cap the isosurface
inputStruct.surfaceCase='g'; %Surface type

% Set parameters for individual gyroid
inputStruct.numPeriods=[2 12 2]; %Number of periods in each direction
inputStruct.levelset=0.8 ; %Isosurface level

% grid coordinates, and levelset values
[F,V,C]=TPMS_LCS(inputStruct);

% Using grouping to keep only largest group
groupOptStruct.outputType='label';
[G,~,groupSize]=tesgroup(F,groupOptStruct); %Group connected faces
[~,indKeep]=max(groupSize); %Index of largest group

% Keep only largest group
F=F(G==indKeep,:); %Trim faces
C=C(G==indKeep,:); %Trim color data
[F,V]=patchCleanUnused(F,V); %Remove unused nodes
```

Visualizing geometry

```
cFigure; hold on;
title('Cyllindrical Cell Arrangment','FontSize',fontSize);
gpatch(F,V,[0.75 0.75 0],'none', 1);
axisGeom(gca,fontSize); axis off;
colormap gjet; icolorbar;
camlight left;
drawnow;
```



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