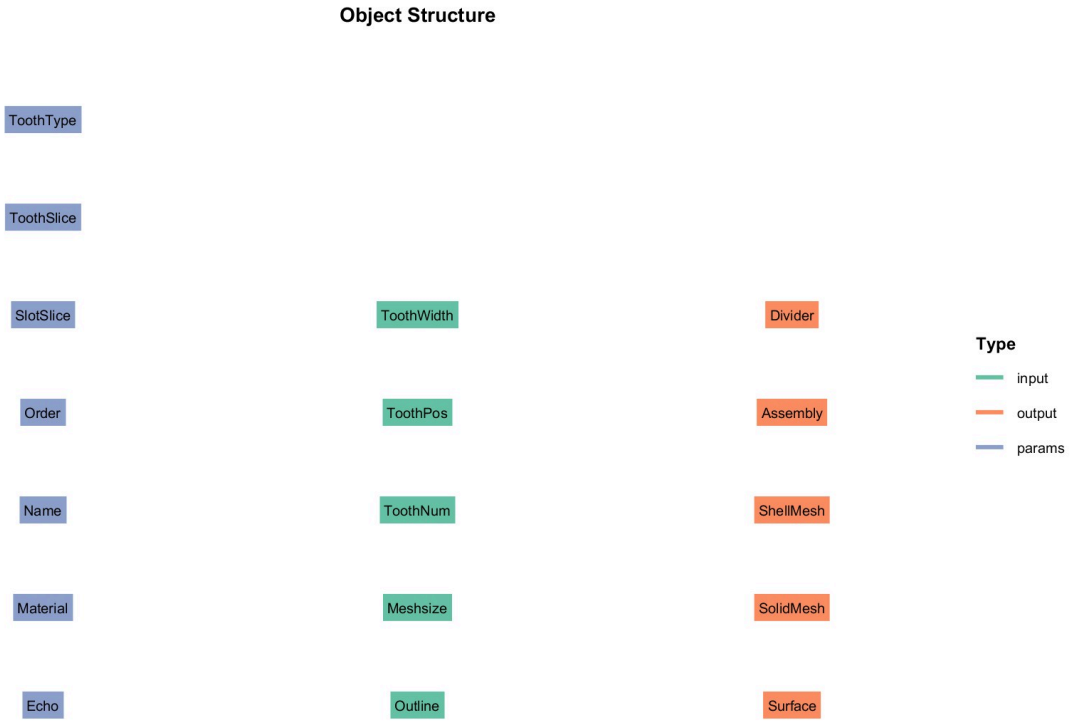
ToothShaft

Xie Yu

1 介绍

ToothShaft可建立端部带齿槽的轴。

2 类结构



输入 input：

- ToothWidth : 齿宽
- ToothPos : 齿部开始位置
- ToothNum : 齿数量
- Meshsize : 网格尺寸
- Outline : 外轮廓Line2D

参数 params:

- Order： 单元阶数
- ToothType : 齿槽类型
- ToothSlice : 齿部网格数量
- SlotSlice : 槽部网格数量
- Name : 名称
- Material : 材料

输出 output :

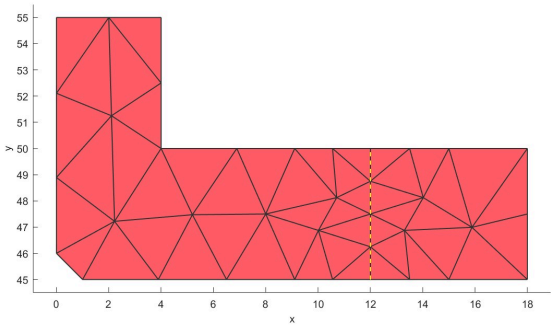
- Assembly : 实体单元装配
- Divider : 分割线
- ShellMesh : 壳网格
- SolidMesh : 实体网格
- Surface : 截面

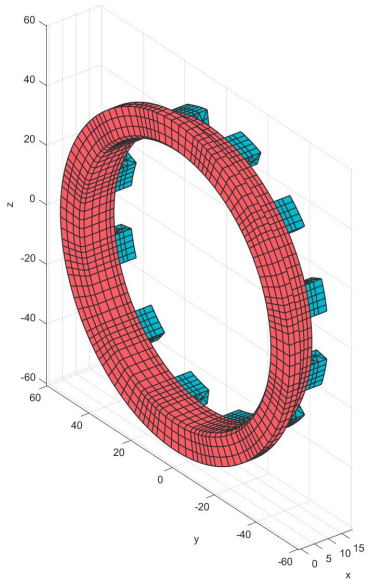
3 案例

3.1 Create ToothShaft (Flag=1)

生成端部带齿槽轴。

```
a=Point2D('Point Ass1');
a=AddPoint(a,[0;4],[110/2;110/2]);
a=AddPoint(a,[4;4],[110/2;100/2]);
a=AddPoint(a,[4;18],[100/2;100/2]);
a=AddPoint(a,[18;18],[100/2;90/2]);
a=AddPoint(a,[18;1],[90/2;90/2]);
a=AddPoint(a,[1;0],[90/2;92/2]);
a=AddPoint(a,[0;0],[92/2;110/2]);

b=Line2D('Line Ass1');
for i=1:7
   b=AddCurve(b,a,i);
end

inputShaft.Outline= b;
inputShaft.ToothPos= 12;
inputShaft.ToothNum= 12;
inputShaft.ToothWidth= 10;

paramsShaft.ToothSlice= 5;
paramsShaft.SlotSlice= 5;

obj1=shaft.ToothShaft(paramsShaft, inputShaft);
obj1=obj1.solve();
Plot2D(obj1);
Plot3D(obj1);
```

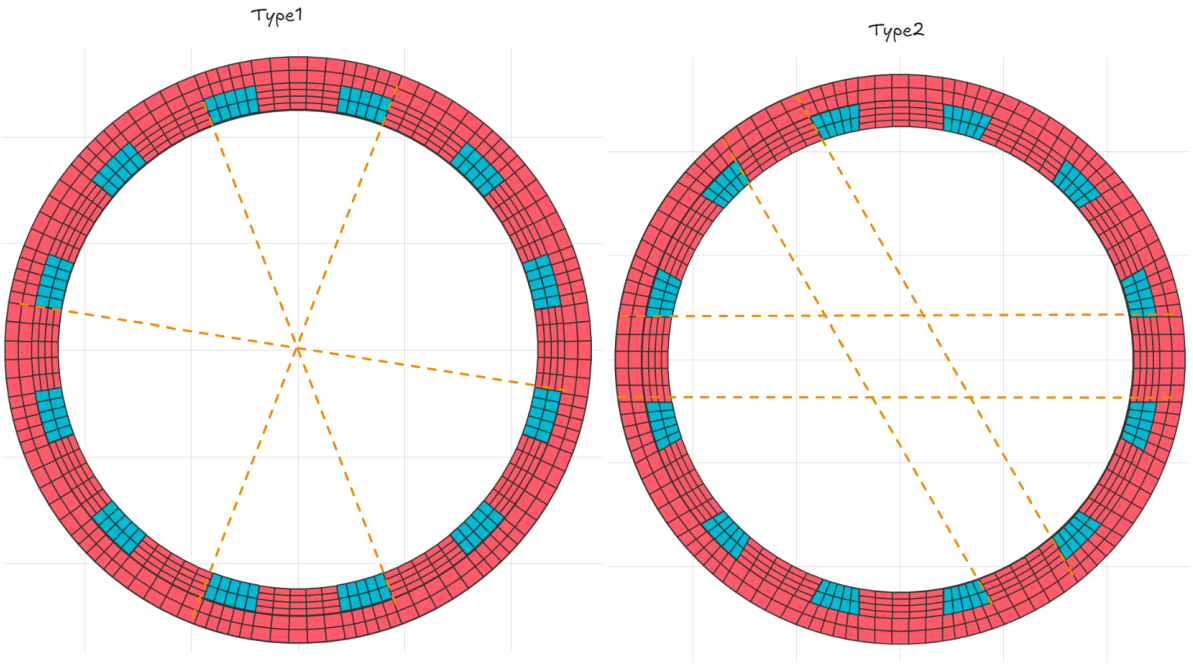


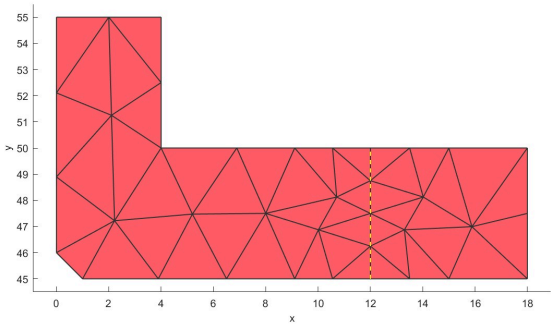


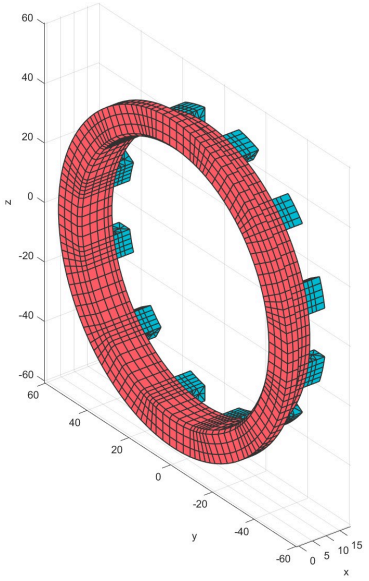
3.2 Change tooth type (Flag=2)

```
a=Point2D('Point Ass1');
a=AddPoint(a,[0;4],[110/2;110/2]);
a=AddPoint(a,[4;4],[110/2;100/2]);
a=AddPoint(a,[4;18],[100/2;100/2]);
a=AddPoint(a,[18;18],[100/2;90/2]);
a=AddPoint(a,[18;1],[90/2;90/2]);
a=AddPoint(a,[1;0],[90/2;92/2]);
a=AddPoint(a,[0;0],[92/2;110/2]);

b=Line2D('Line Ass1');
for i=1:7
  b=AddCurve(b,a,i);
end

inputShaft.Outline= b;
inputShaft.ToothPos= 12;
inputShaft.ToothNum= 12;
inputShaft.ToothWidth= 10;

paramsShaft.ToothSlice= 5;
paramsShaft.SlotSlice= 5;
paramsShaft.ToothType= 2;

obj1=shaft.ToothShaft(paramsShaft, inputShaft);
obj1=obj1.solve();
Plot2D(obj1);
Plot3D(obj1);
```

Type1和Type2是两种不同的齿槽，Type1齿部的边界延长线都指向圆心，Type2的边界线为平行线。



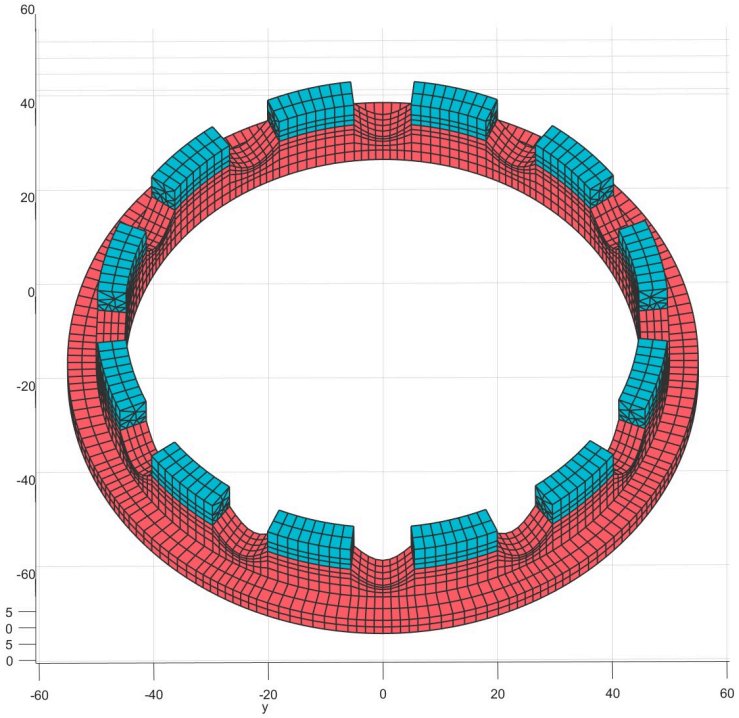




3.3 Circle groove slot type (Flag=3)

```
a=Point2D('Point Ass1');
a=AddPoint(a,[0;4],[110/2;110/2]);
a=AddPoint(a,[4;4],[110/2;100/2]);
a=AddPoint(a,[4;18],[100/2;100/2]);
a=AddPoint(a,[18;18],[100/2;90/2]);
a=AddPoint(a,[18;1],[90/2;90/2]);
a=AddPoint(a,[1;0],[90/2;92/2]);
a=AddPoint(a,[0;0],[92/2;110/2]);
b=Line2D('Line Ass1');
for i=1:7
  b=AddCurve(b,a,i);
end
inputShaft.Outline= b;
inputShaft.ToothPos= 12;
inputShaft.ToothNum= 12;
```

```
inputShaft.ToothWidth= 15;
paramsShaft.ToothSlice= 8;
paramsShaft.SlotSlice= 8;
paramsShaft.ToothType= 1;
paramsShaft.SlotType= 2;
paramsShaft.LeftLimit= 4;
obj1=shaft.ToothShaft(paramsShaft, inputShaft);
obj1=obj1.solve();
Plot2D(obj1);
Plot3D(obj1);
```



4 参考文献