ELEC4010M/MECH4000J Project#2

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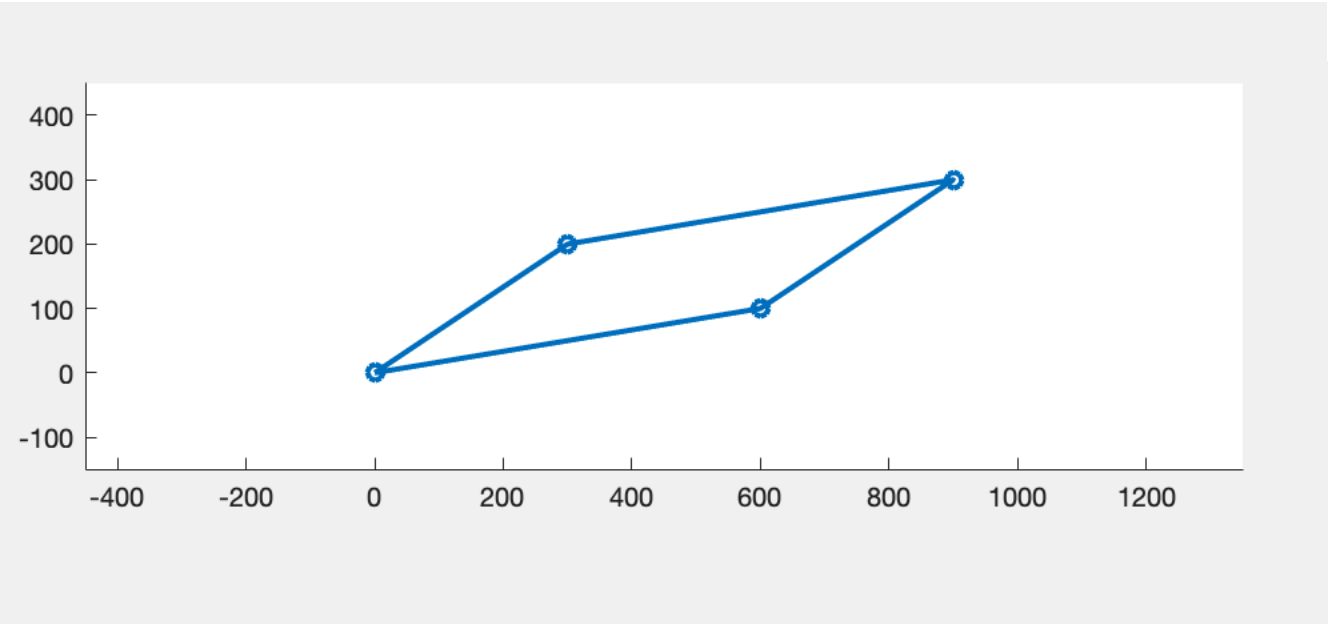
Visualize the shape of the polygon

```
>> vertices = input("Please enter a list of vertices");
Please enter a list of vertices[0, 0; 600, 100; 900, 300; 300, 200]
>> vertices=poly(vertices);
vertices are
     0     0
   600   100
   900   300
   300   200
```




```
%% Ask for vertices and visuallize polygon
%example: [0, 0; 600, 100; 900, 300; 300, 200]
vertices = input("Please enter a list of vertices");
vertices = poly(vertices);
```

Fraction Coefficient

```
%% Ask for fraction coefficient
%example: 1
friction = input("Please enter the coefficient of friction");
```

```
>> friction = input("Please enter the coefficient of friction")
Please enter the coefficient of friction1

friction =

     1
```

All Force-closure grasps

```
%% Detect force closure
clc, close all;
[pt1_set, pt2_set] = detect_fc(vertices,friction);
```

```
>> [pt1_set, pt2_set] = detect_fc(vertices,friction);
points1 are
  845.4545  290.9091         0

points2 are
  272.7273  181.8182         0

no force closure
points1 are
  845.4545  290.9091         0

points2 are
  245.4545  163.6364         0

no force closure
```

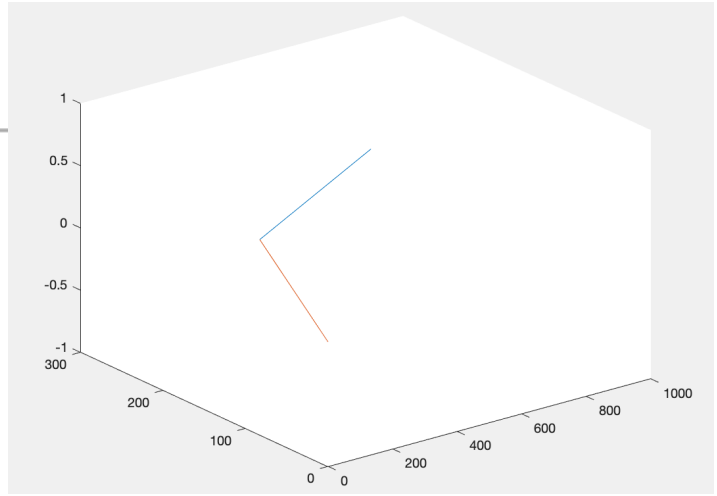


Fig 1: No F-C points in one pair of edges

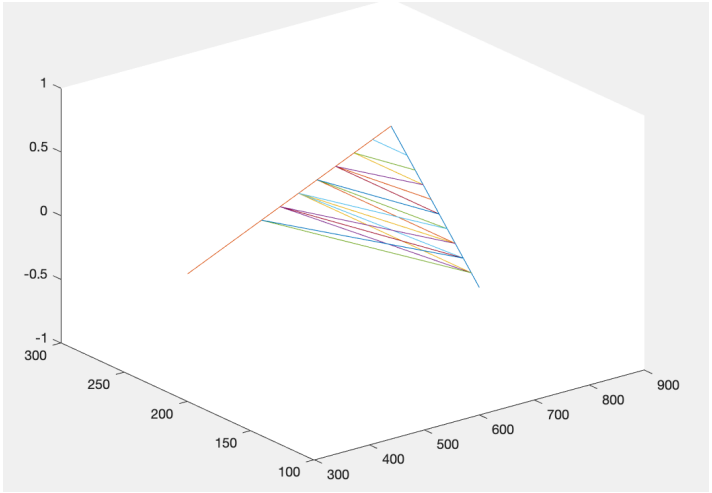
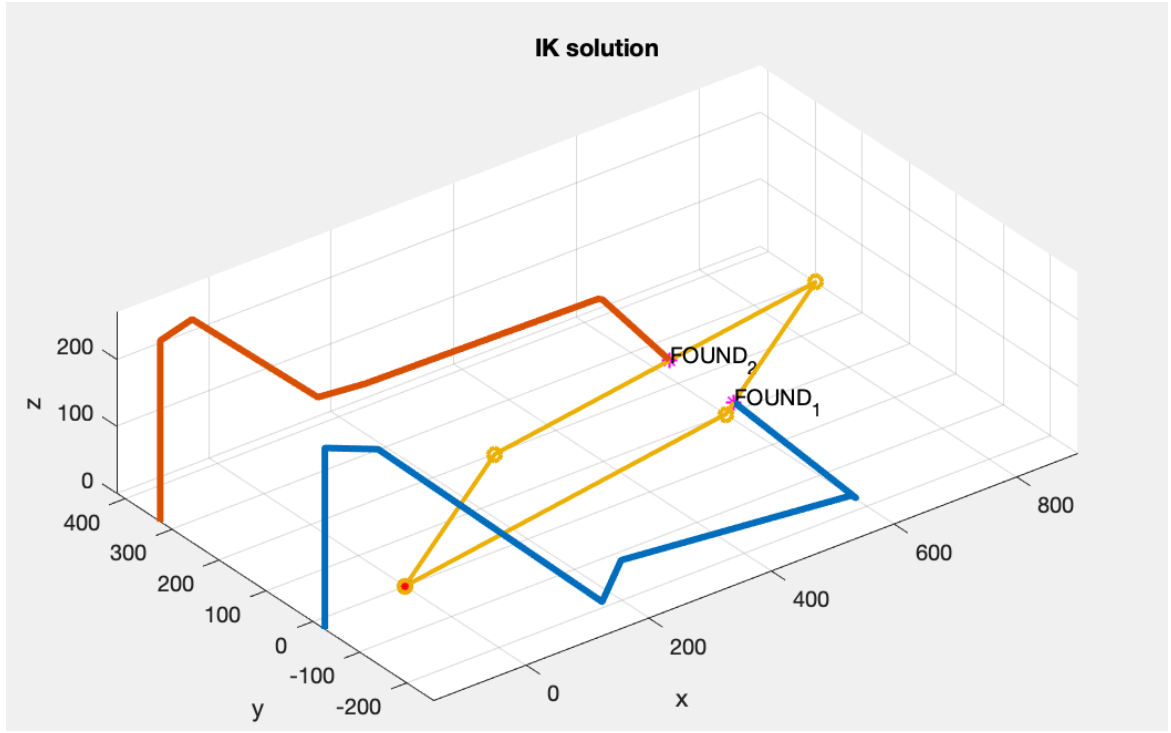


Fig 2: All F-C points in one pair of edges

Robot force closure grasping configurations

```
>> plot_dual(pt1_set,pt2_set,vertices);
Ideal End Position
  627.2727  118.1818         0

  627.2727  254.5455         0

IK Dual starts
Solutions found in degrees, wrist roll2 is set to default 0
  -40.1281   37.1727  121.7857   48.3281  126.3487  -78.1373
   27.8414  -27.9356  -26.7184  121.0526  173.8308   85.7837
   -7.3820  -27.8753   27.1094  121.1010 -174.0319   85.6197
  -38.0162   44.1864   66.6920   76.6635  -82.0853  -78.3510

Position from forward kinematics for solution1
  627.2727  118.1818    0.0000

IK Dual starts
Solutions found in degrees, wrist roll2 is set to default 0
   15.7699   41.6907 -123.3840   99.1019 -172.7963  111.0590
   22.4229   16.4307  -18.7740   55.7268 -120.3212  105.0854
   23.0696  -40.5564  -20.8277   67.7502  -23.0579   60.3147
  -75.0420   56.1103  112.4037  106.4825 -118.9566   52.7854
  -66.7531    7.3967   73.6203   66.3847  174.8022  -54.6245

Position from forward kinematics for solution1
  627.2727  254.5455   -0.0000
```



Note: the first set of configurations solutions is used

Note: dual arm collision checking is NOT performed