In [15]:
```
from openscad1 import *
```

## Steps to compute offset

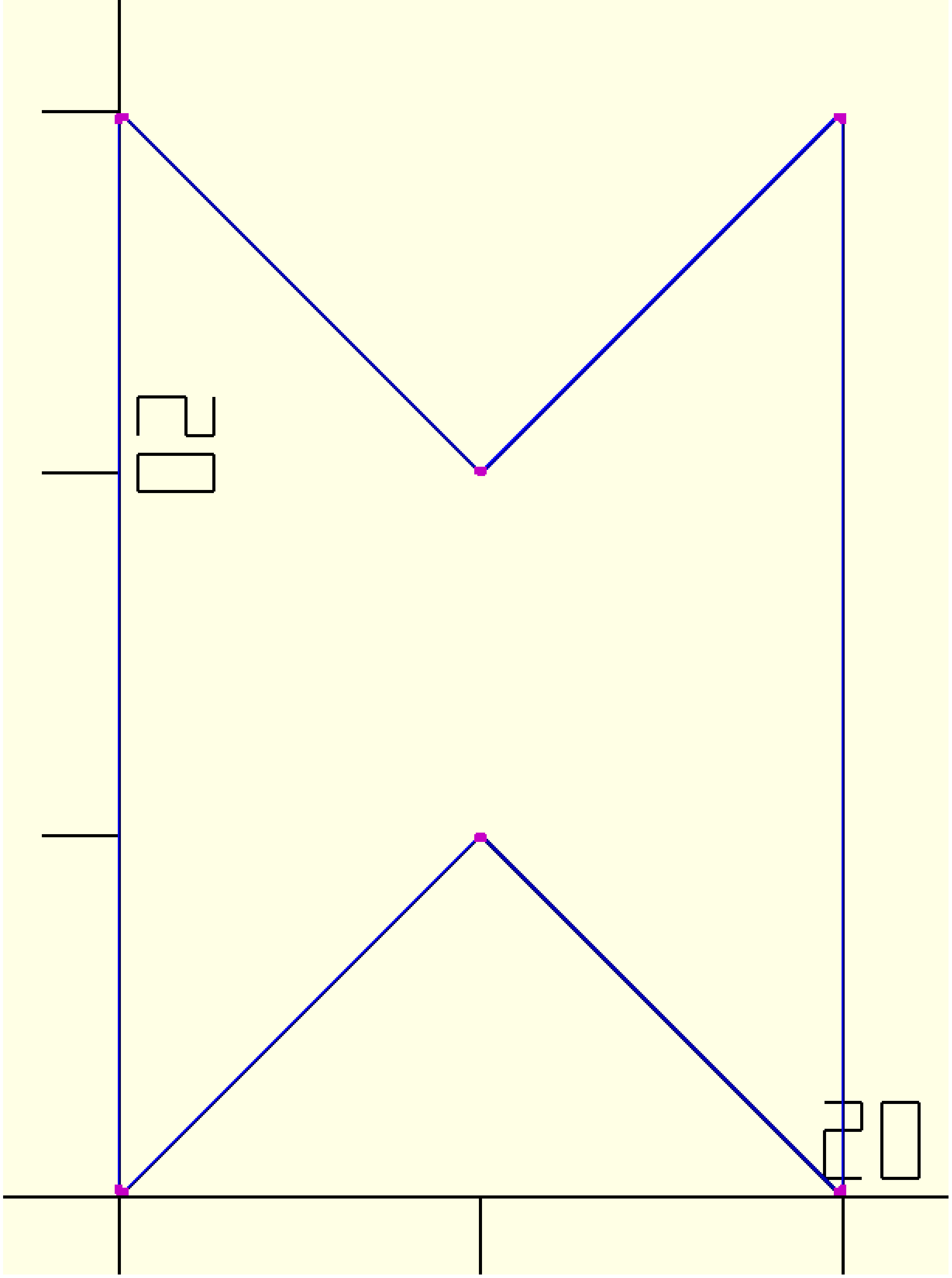
## original section

In [56]:
```
sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)

with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);

    ''')
```



## create and offset the line segments and find intersection of adjecent lines

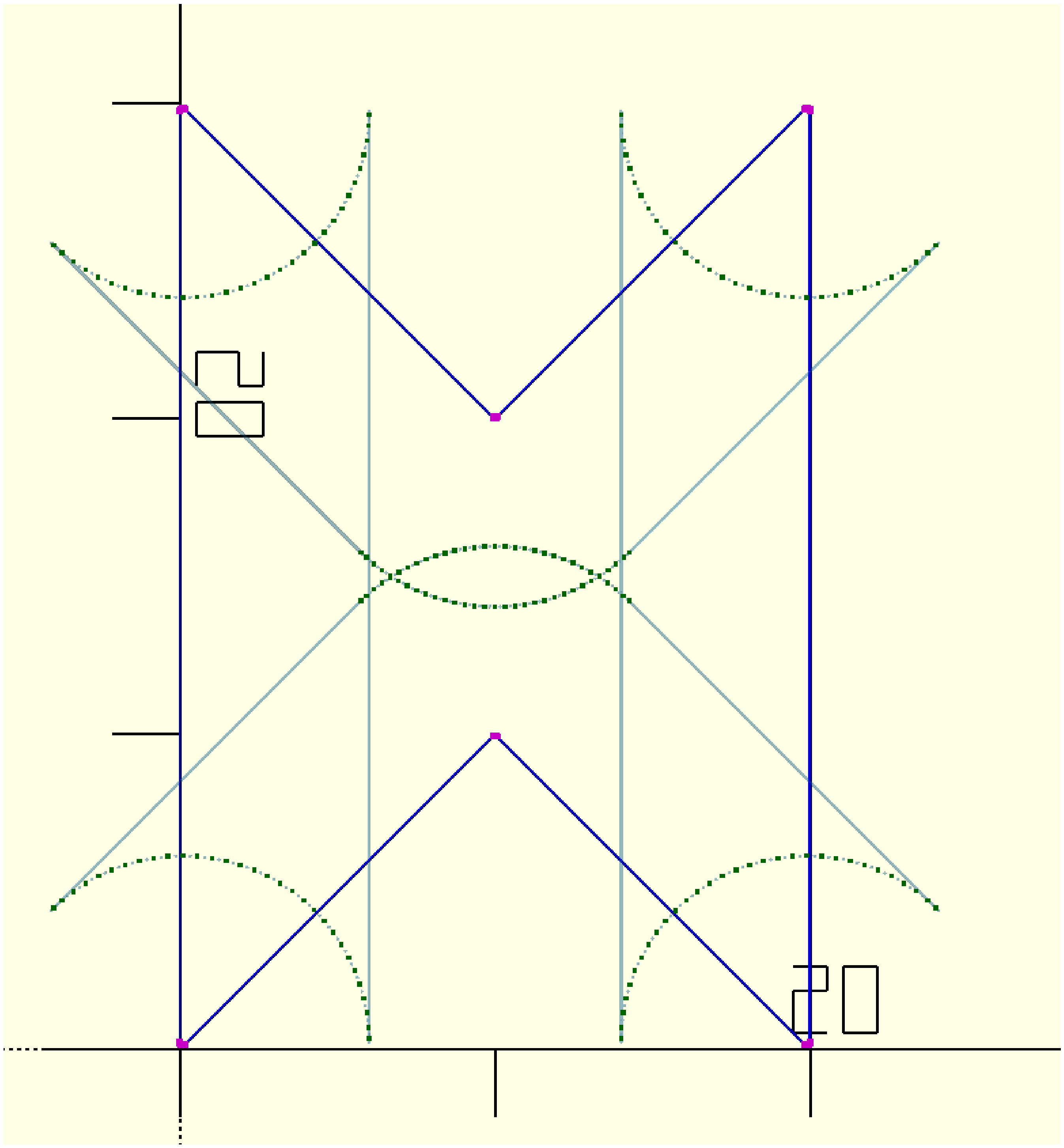
In [66]:
```
sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)

r=-6 # amount of offset required
sec1=offset_segv(sec,r) # create offset line segments
i_p1=intersections(sec1) # this creates intersections even at concave points
```

```
with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);
    color([.2,.6,.8,.3])for(p={sec1})p_line3d(p,.1);
    color("green")points({i_p1},.15);

    ''')
```



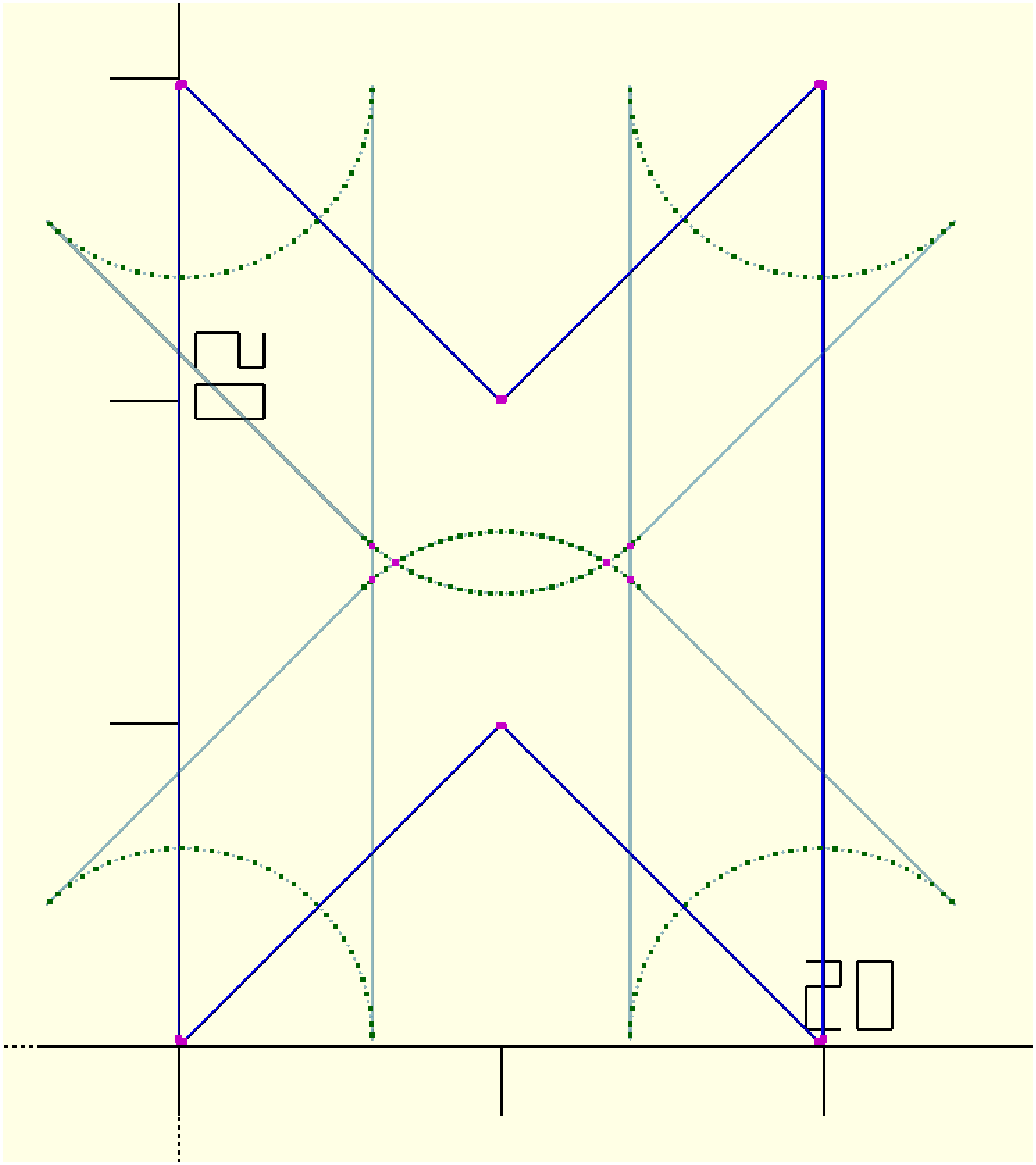
## find global intersections

In [65]:
```
sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)
r=-6 # amount of offset required
sec1=offset_segv(sec,r) # create offset line segments
```

```
i_p1=intersections(sec1) # this creates intersections even at concave points
g_i=s_int1(seg(i_p1)) # global intersection from the intersection points calculated abov
with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);
    color([.2,.6,.8,.3])for(p={sec1})p_line3d(p,.1);
    color("green")points({i_p1},.15);
    color("magenta")points({g_i},.2);

    ''')
```



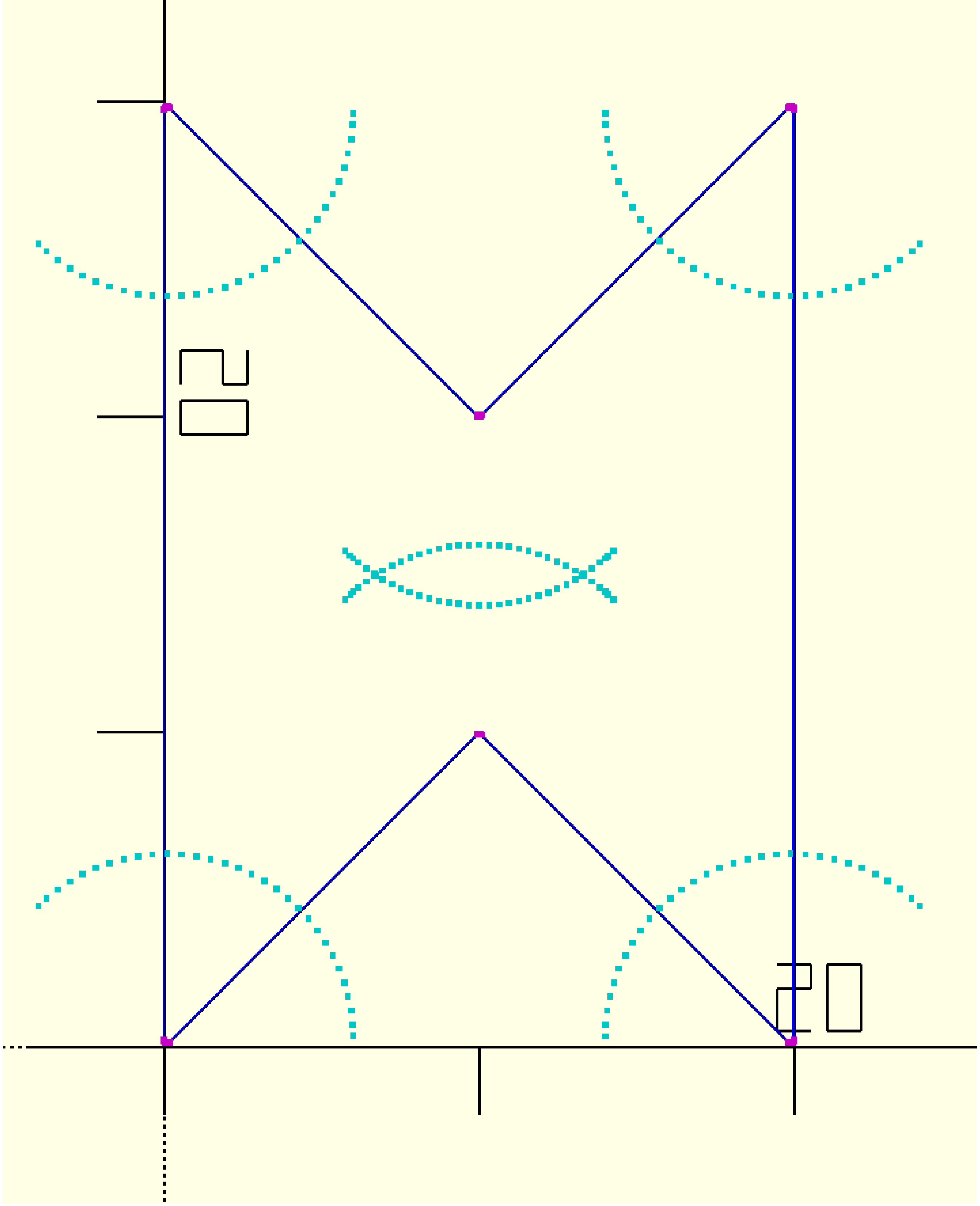
## add intersections and global intersections together

```
In [64]: sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)
         r=-6 # amount of offset required
         sec1=offset_segv(sec,r) # create offset line segments
         i_p1=intersections(sec1) # this creates intersections even at concave points
         g_i=s_int1(seg(i_p1)) # global intersection from the intersection points calculated abov
         sec2=i_p1+g_i

         with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
             f.write(f'''

             include<dependencies2.scad>
             color("blue")p_line3dc({sec},.1);
             color("magenta")points({sec},.2);
             color("cyan")points({sec2},.2);

             ''')
```



## identify all the points which are inside the original section and rest of the points can be discarded

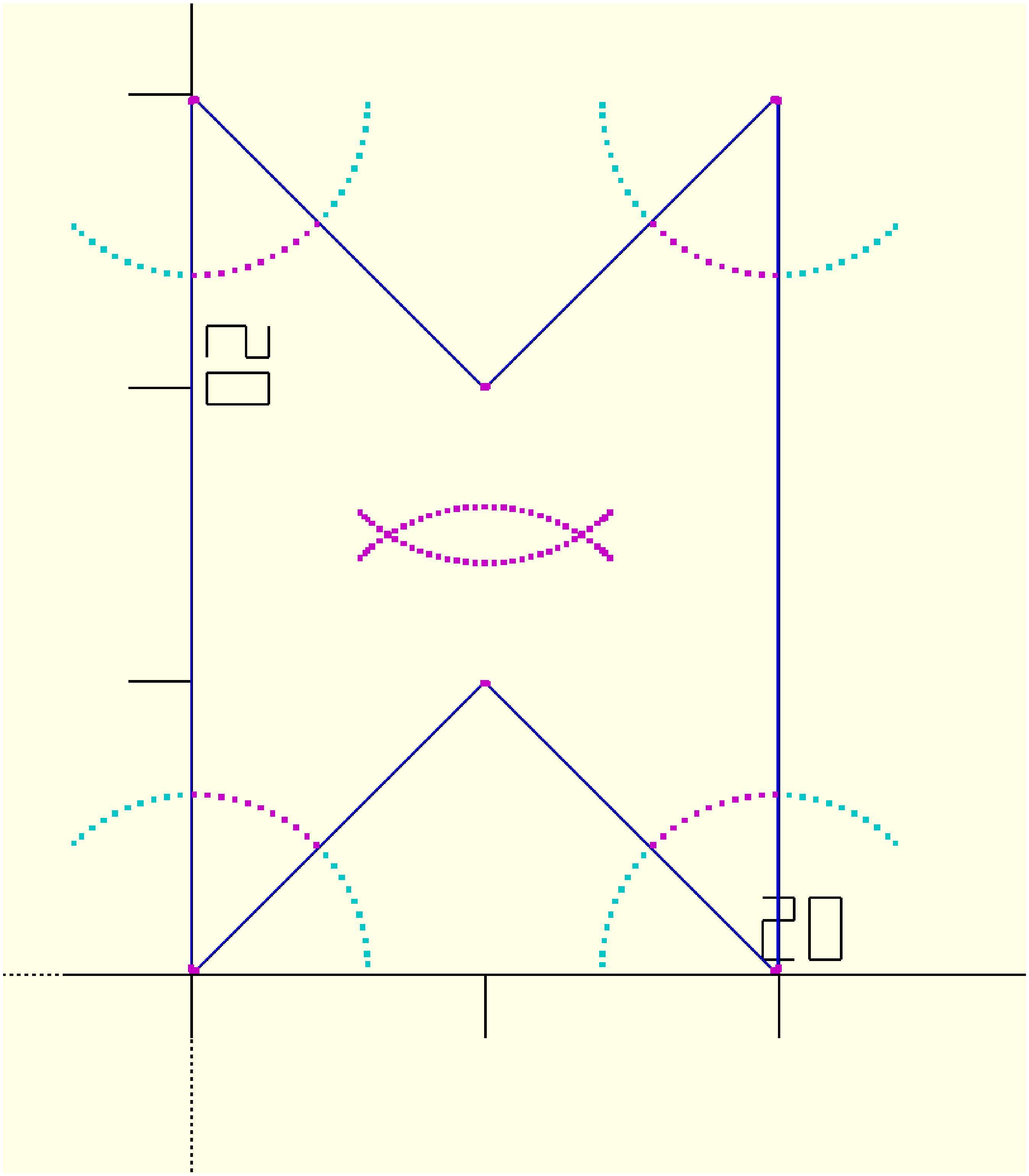
In [63]:
```
sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)
r=-6 # amount of offset required
sec1=offset_segv(sec,r) # create offset line segments
i_p1=intersections(sec1) # this creates intersections even at concave points
g_i=s_int1(seg(i_p1)) # global intersection from the intersection points calculated abov
sec2=i_p1+g_i
```

```
p0=pies1(sec,sec2) # only these points are required to be processed further

with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);
    color("cyan")points({sec2},.2);
    color("magenta")points({p0},.2);

    ''')
```



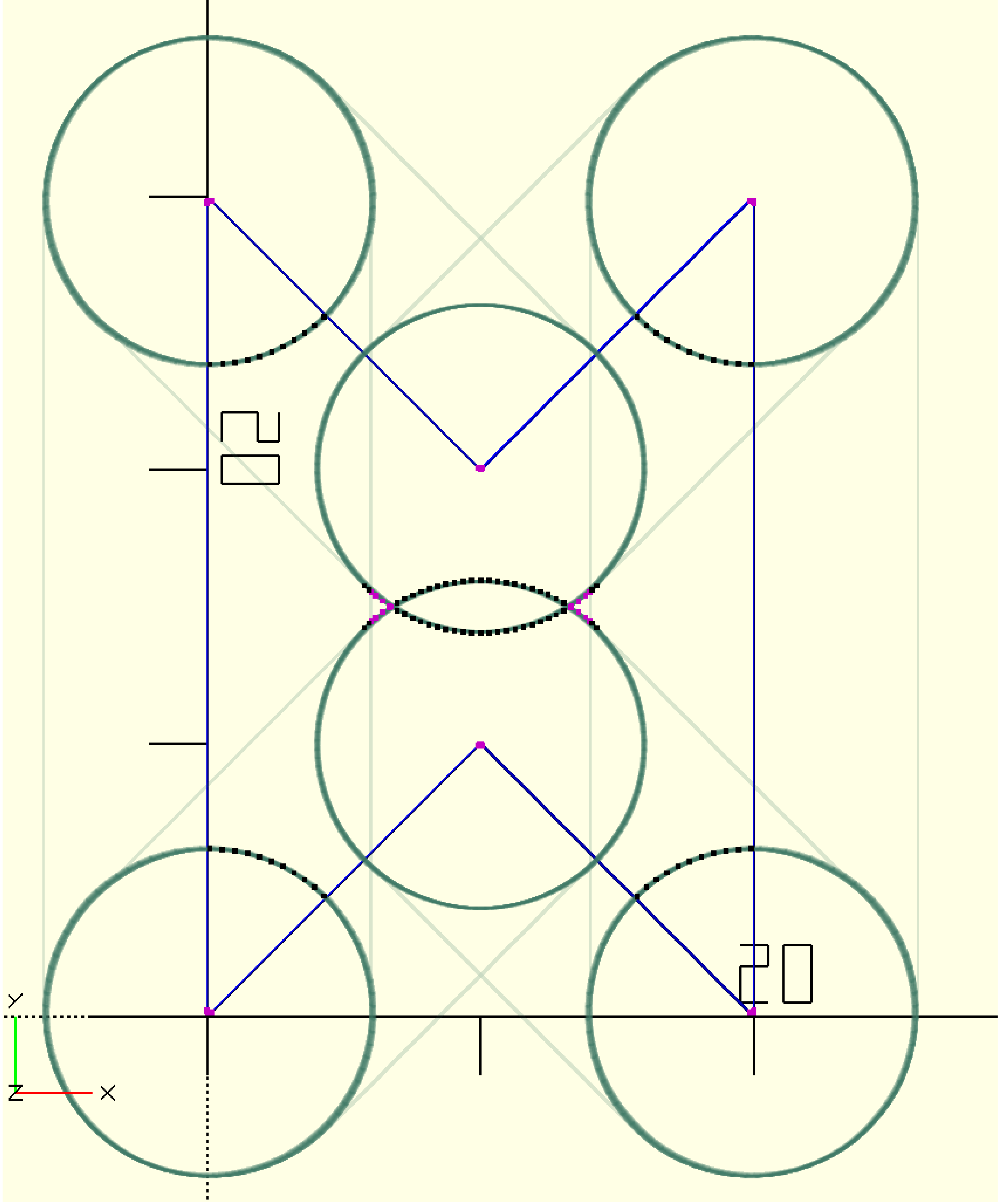
Draw rounded sections around each line segment of

## original section

```
In [61]: sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)
r=-6 # amount of offset required
sec1=offset_segv(sec,r) # create offset line segments
i_p1=intersections(sec1) # this creates intersections even at concave points
g_i=s_int1(seg(i_p1)) # global intersection from the intersection points calculated abov
sec2=i_p1+g_i
p0=pies1(sec,sec2) # only these points are required to be processed further
rounded_sections=cs1(sec,abs(r)-.01)
p1=[pies1(p,p0) for p in rounded_sections if pies1(p,p0)!=[]]
p1=concatenate(p1)
p1=remove_extra_points(p1)
with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);
    //color("cyan")points({sec2},.2);
    color("magenta")points({p0},.2);
    color([.3,.6,.5,.1])for(p={rounded_sections})p_line3dc(p,.1,rec=1);
    color("black")points({p1},.2);

    ''')
```



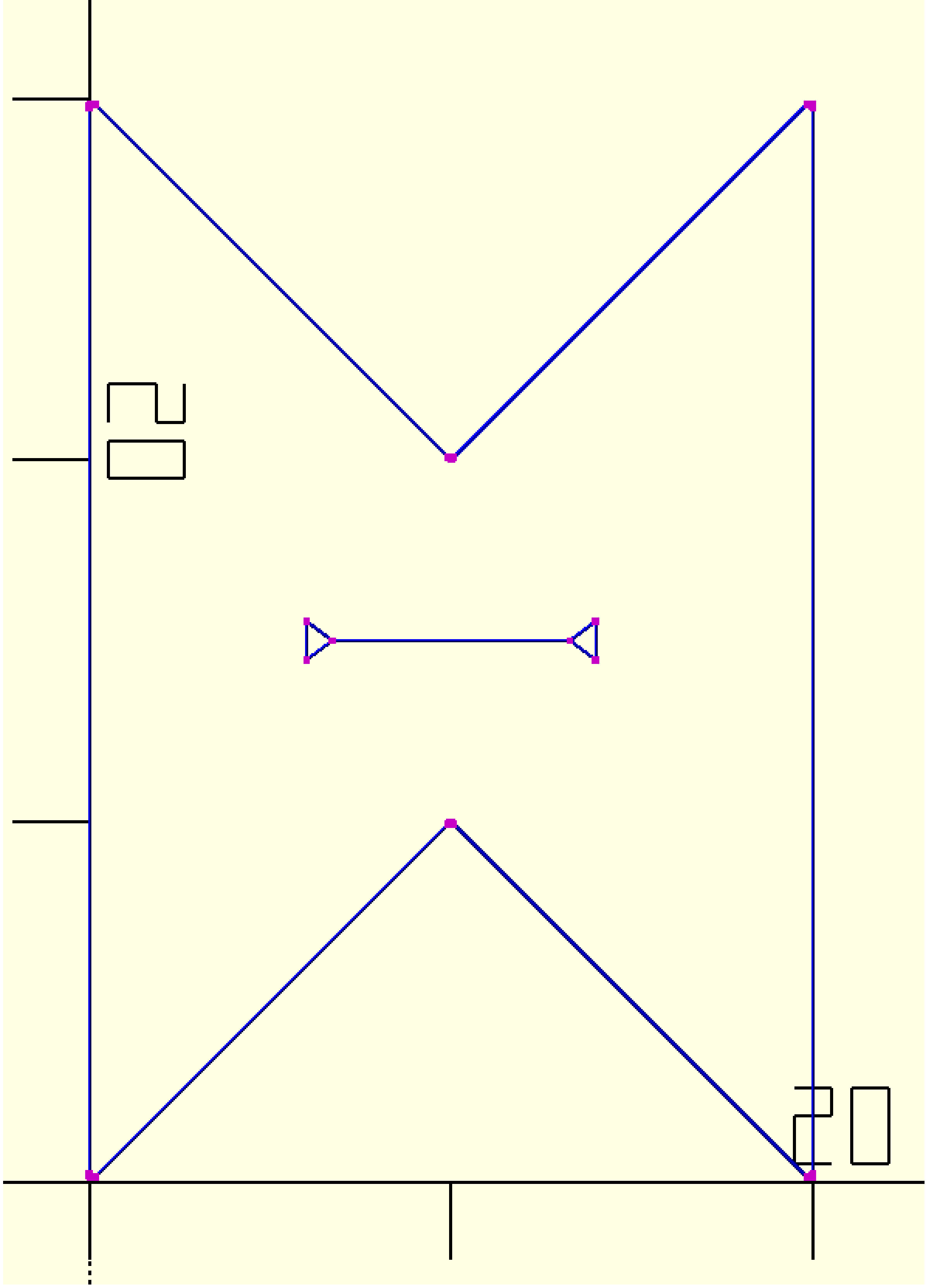
## remaining points needs to be ordered based on the original points

```
In [62]: sec=cr(pts1([[0,0,.1],[10,10,.1],[10,-10,.1],[0,30,.1],[-10,-10,.1],[-10,10,.1]]),30)
         r=-6 # amount of offset required
         sec1=offset_segv(sec,r) # create offset line segments
         i_p1=intersections(sec1) # this creates intersections even at concave points
         g_i=s_int1(seg(i_p1)) # global intersection from the intersection points calculated abov
         sec2=i_p1+g_i
         p0=pies1(sec,sec2) # only these points are required to be processed further
```

```
rounded_sections=cs1(sec,abs(r)-.01)
p1=[pies1(p,p0) for p in rounded_sections if pies1(p,p0)!=[]]
p1=concatenate(p1)
p1=remove_extra_points(p1)
p2=exclude_points(p0,p1)
p2=sort_points(sec,p2)
with open('/users/sanjeevprabhakar/openscad/trial.scad','w+') as f:
    f.write(f'''

    include<dependencies2.scad>
    color("blue")p_line3dc({sec},.1);
    color("magenta")points({sec},.2);
    //color("cyan")points({sec2},.2);
    //color("magenta")points({p0},.2);
    //color([.3,.6,.5,.1])for(p={rounded_sections})p_line3dc(p,.1,rec=1);
    //color("black")points({p1},.2);
    color("magenta")points({p2},.2);
    color("blue")p_line3dc({p2},.1);

    ''')
```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