Surface Wrapper Intersects Itself

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Common Causes

An Intersecting external flow wrapper can be causes by CAD geometry intersecting itself or by the mesh becoming rough and inaccurate in certain areas.

Identifying the error

The Solve.out file will show the error:

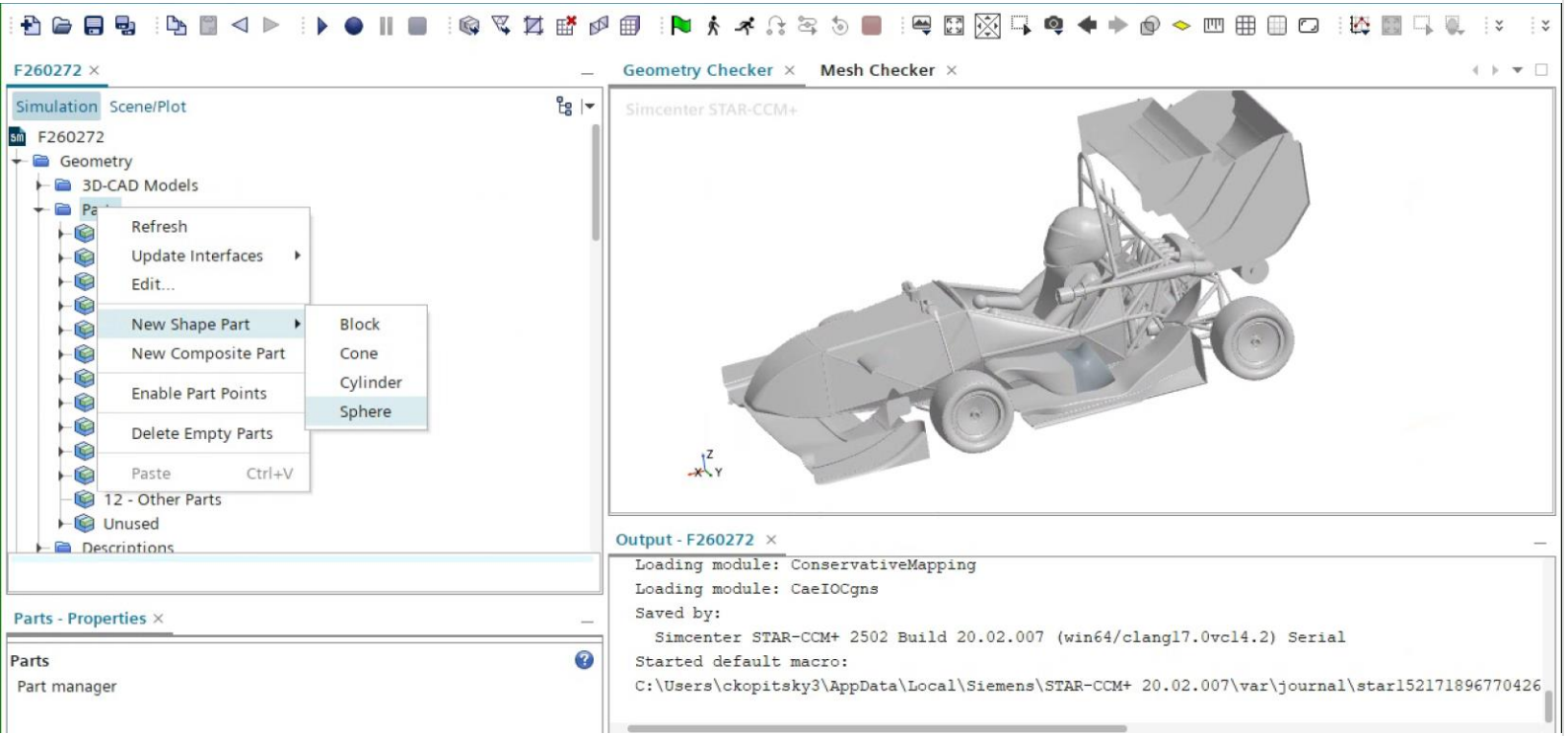
```
----------------------------------------
Failed meshing part 1 of 5 : 3 - External Flow Wrapper
Surface intersects self.
----------------------------------------
Command: GenerateVolumeMesh
   command: CommandComplete
   error: Server Error
```

Identifying the error

Navigate near the top of the file, and you will see the following warning:

```
----------------------------------------
Executing Mesh Operation 4 - Mesh
----------------------------------------
----------------------------------------
Meshing Part 1 of 5 : 3 - External Flow Wrapper
----------------------------------------
Surface Remesher is up to date for Part 3 - External Flow Wrapper
Executing Trimmed Cell Mesher for Part 3 - External Flow Wrapper
WARNING: Surface is self-intersecting within machine precision. located at:
  (-1.84745 0.476956 0.634654)
  (-1.84763 0.476687 0.634987)
  (-1.84869 0.476877 0.63458)
  (-1.84861 0.476858 0.634657)
  (-1.84751 0.477395 0.634023)
  (-1.84763 0.477421 0.63415)
  (-1.84727 0.47748 0.63403)
  (-1.84847 0.477451 0.634351)
  (-1.84866 0.476631 0.634836)
  (-1.84743 0.477032 0.634672)
  (-1.84794 0.477092 0.634455)
  (-1.84825 0.47731 0.634428)
```

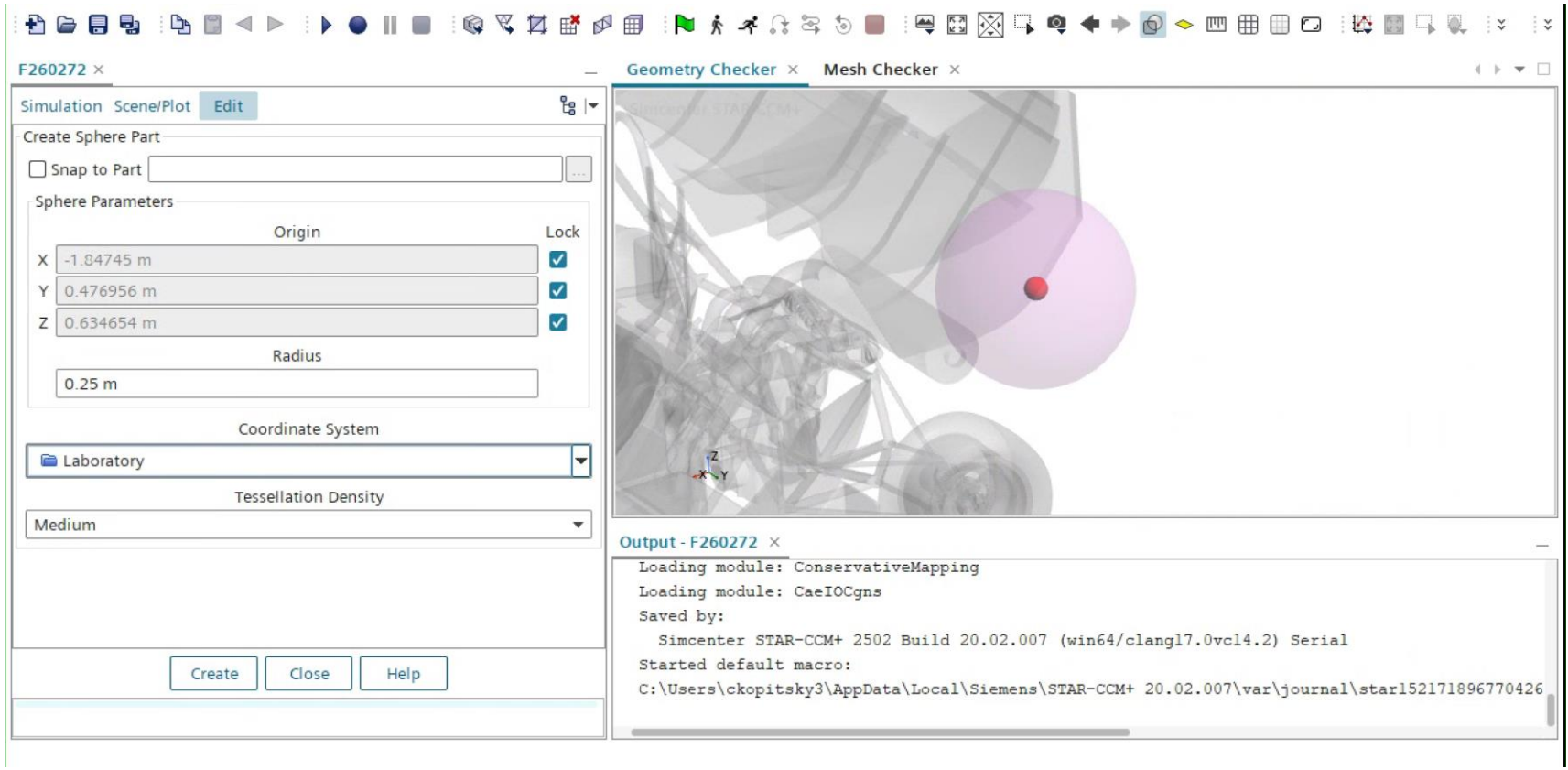
Finding the intersection

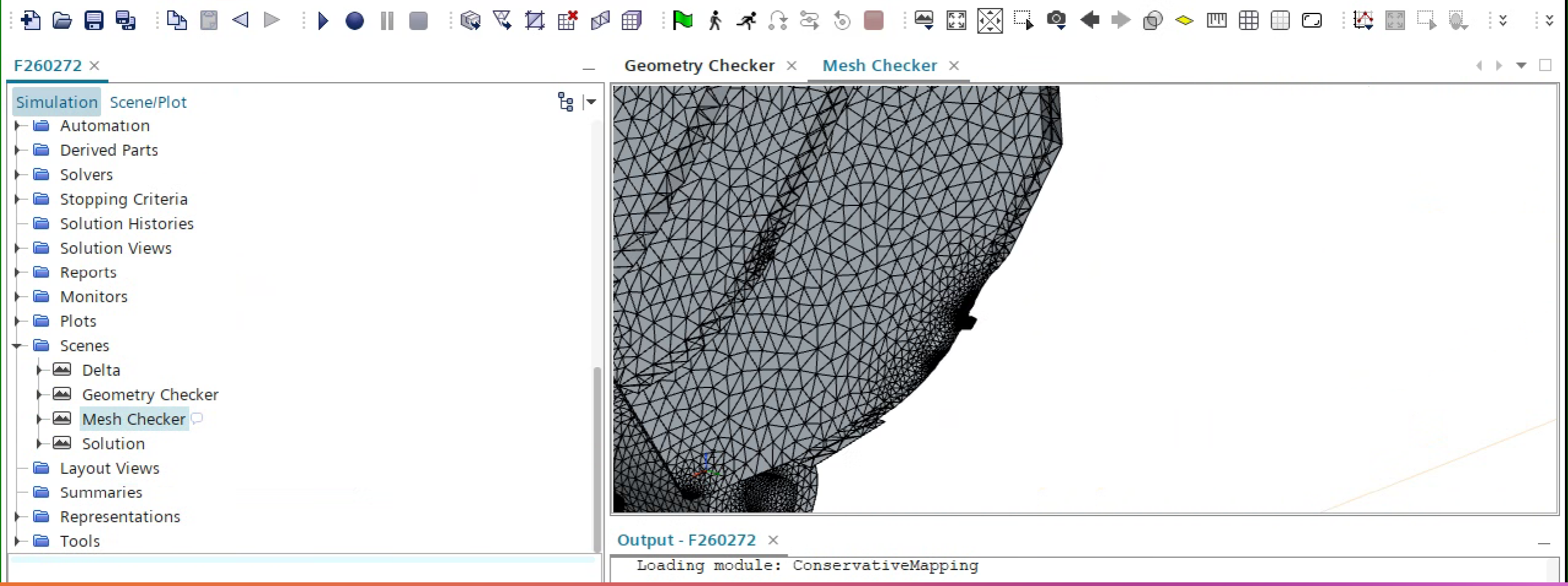


To find where the surface intersects itself, open the Geometry Checker, then go to Gemoetry -> Parts (Right-Click)-> New Shape Part -> Sphere

Finding the Intersection

Input the coordinates from the Solve.out file (Hint: lock them so you do not accidentally drag the sphere). You can now easily see where the problem is occurring.

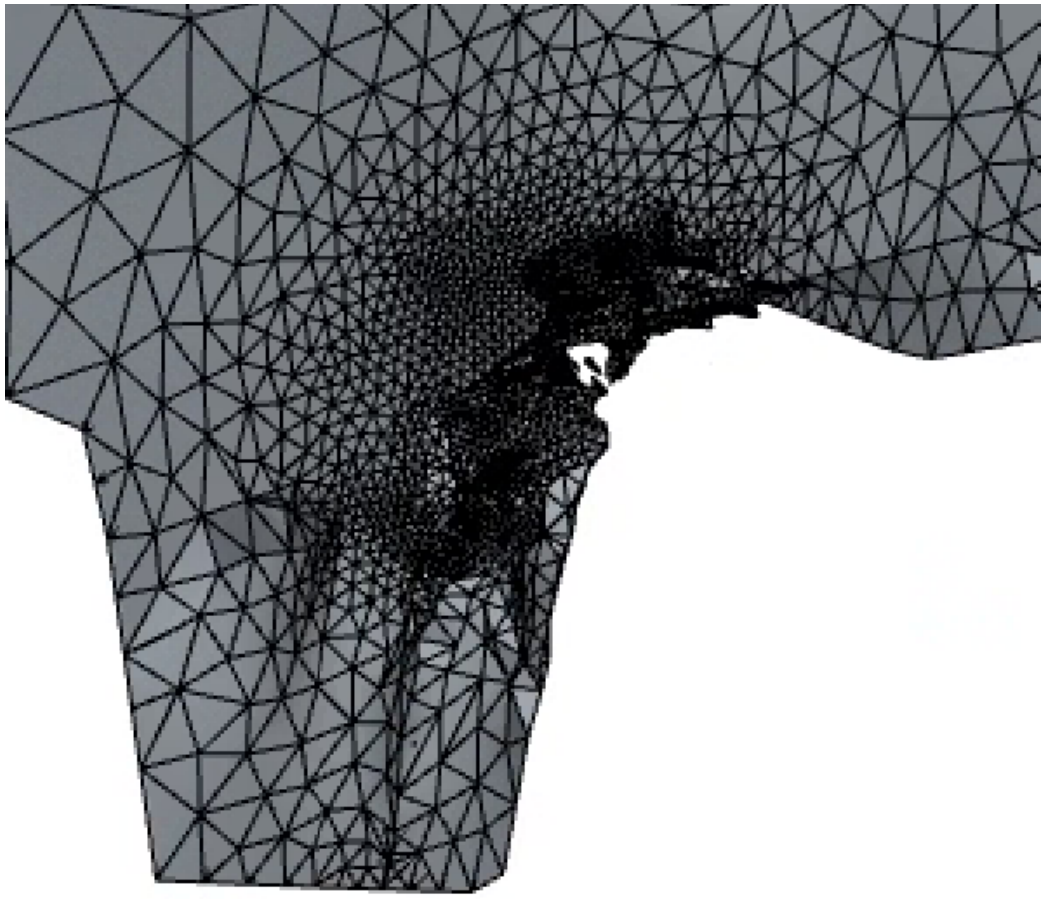




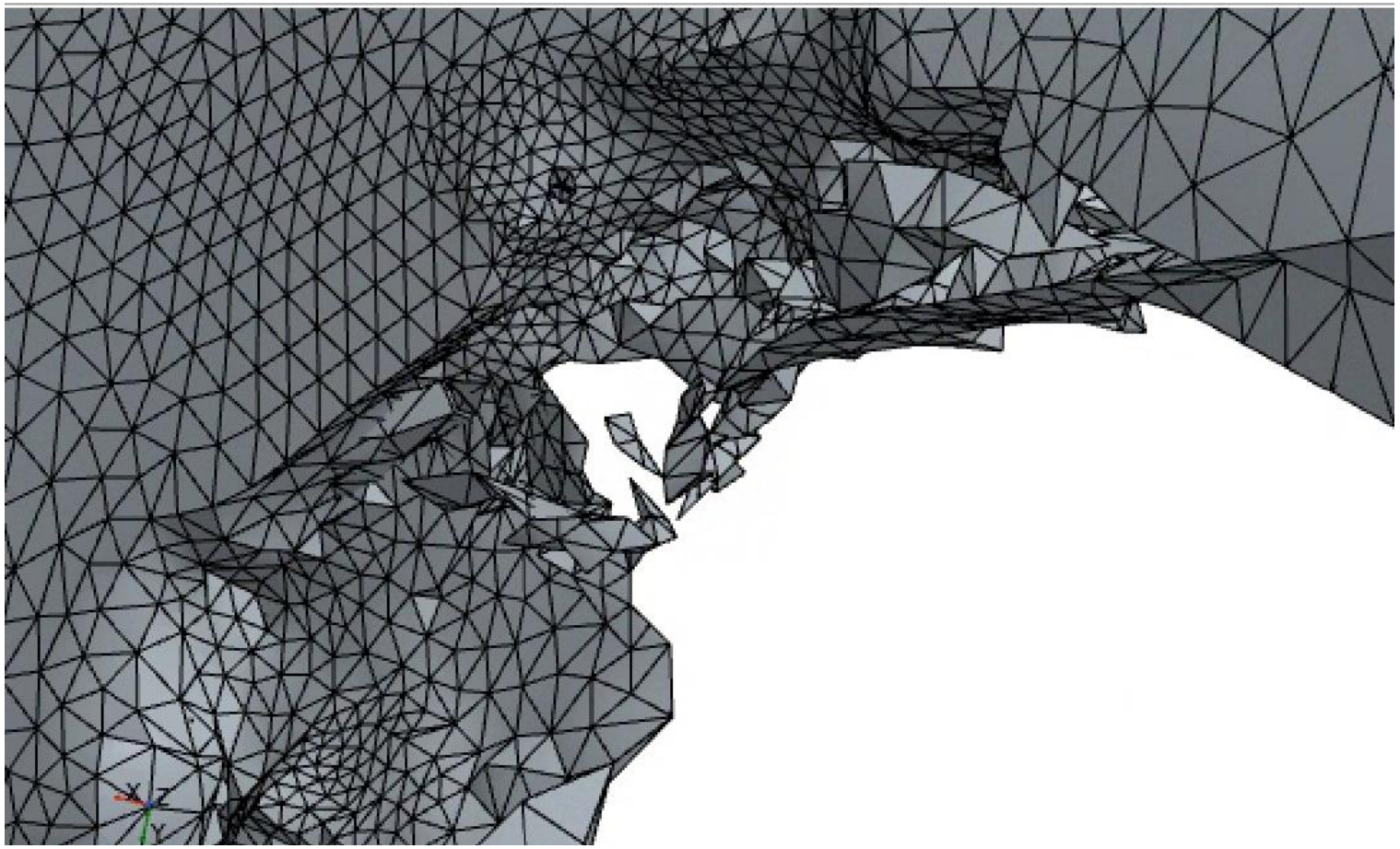
Seeing the Mesh

And here you can see the problem child in the mesh

Wow that’s ugly



Impressively Ugly



Fixing the Mesh

For this issue, there are two possible fixes:

1. Increase the mesh fidelity. The mesh settings for a part are defined under the part's surfaces (See how to run the sim queue). In this case, it was set to SW4 SM5 PL10, so increasing it to SW8 SM8 PL10 may be a solution
2. The part here is very thin (<1mm), so increasing the thickness may make meshing easier.