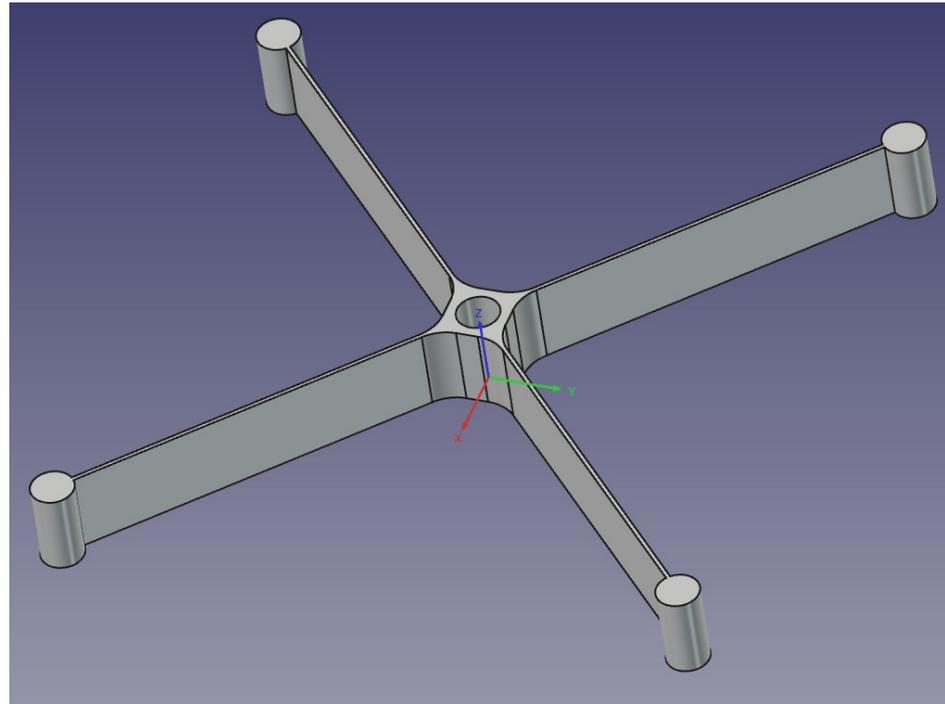


Subject 2026 - FEM/XFEM

Mixed Beam model

- Sometimes, structures have both massive parts and at the same time, very thin and slender parts.

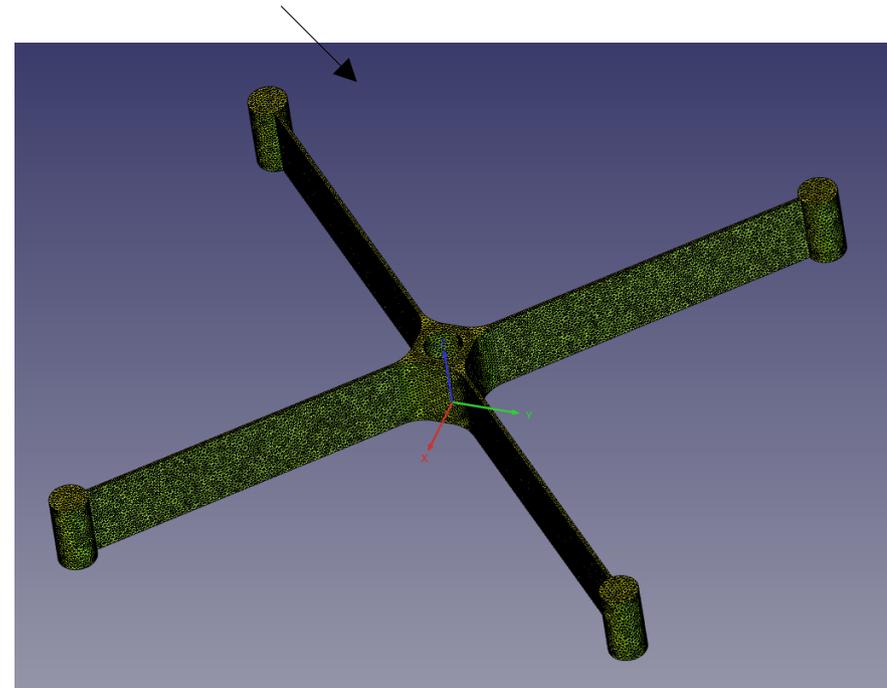
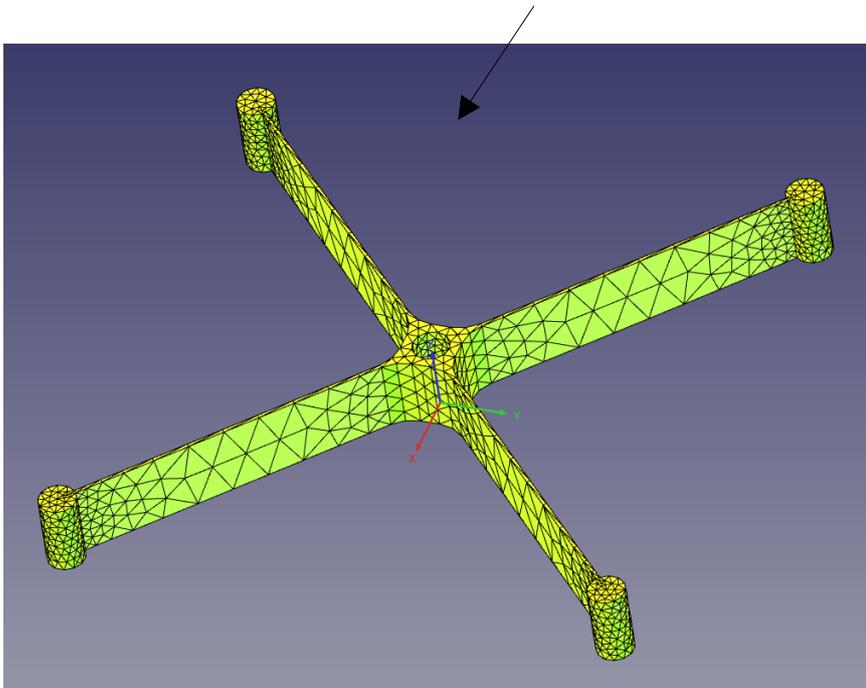


- The geometrical model is a full 3D model, without any “idealization”

Subject 2026 - FEM/XFEM

Mixed Beam model

- Simulating everything in 3D is not always possible (very inaccurate and/or too expensive).



- Idealization → e.g. beams/struts/shells BUT the 3D model is not idealized !

Subject 2026 - FEM/XFEM

Mixed Beam model

- Idea : use the volume mesh, but make sure the cinematic is that of a beam (in 2D) or a shell (in 3D)
 - Beam elements include rotations at nodes
 - “Usual” FEM based on the volume mesh does not.
- How to make this happen ?
 - How to define the support of the idealized geometry ?
 - How to make sure the cinematic is equivalent to that of a beam ?
 - ...