

Project Chrono - REEF3D

**Potential for FEA-CFD coupling for dynamic
structure simulations**

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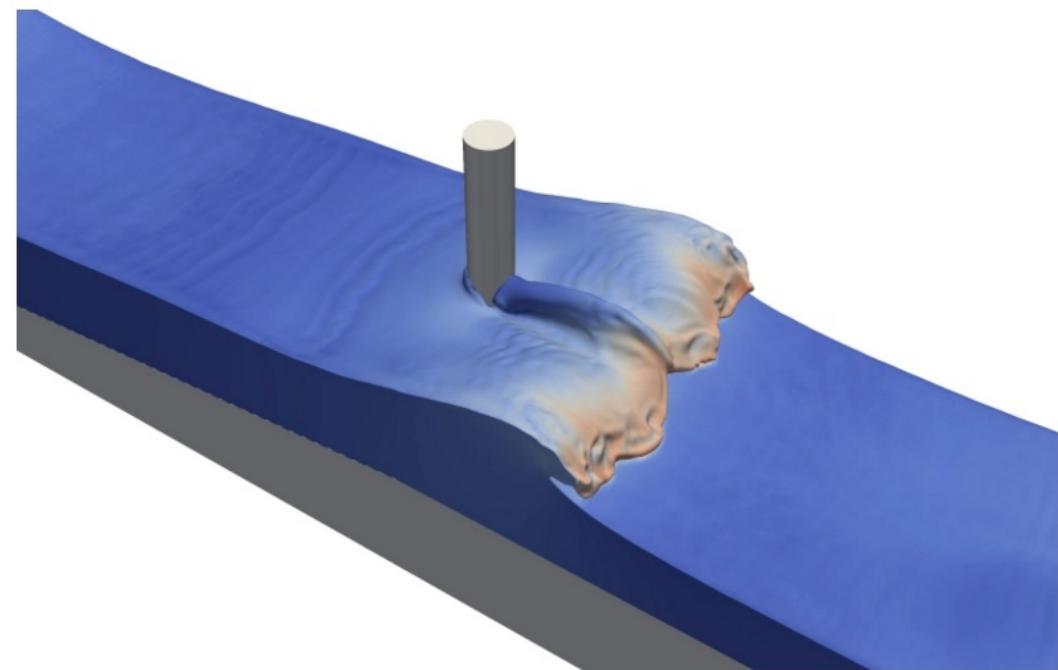
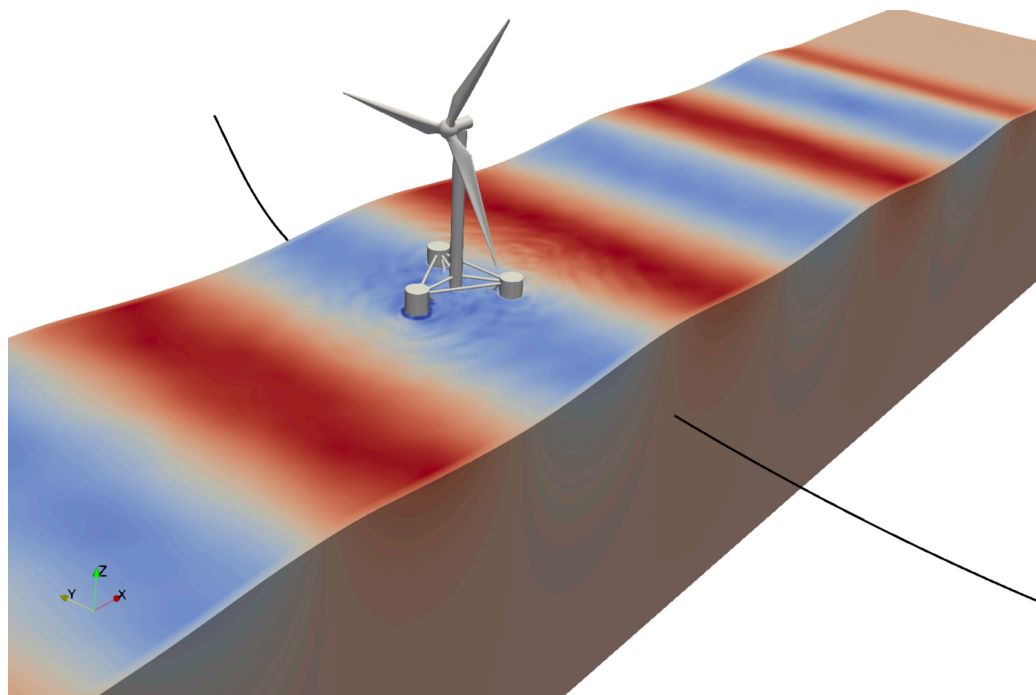
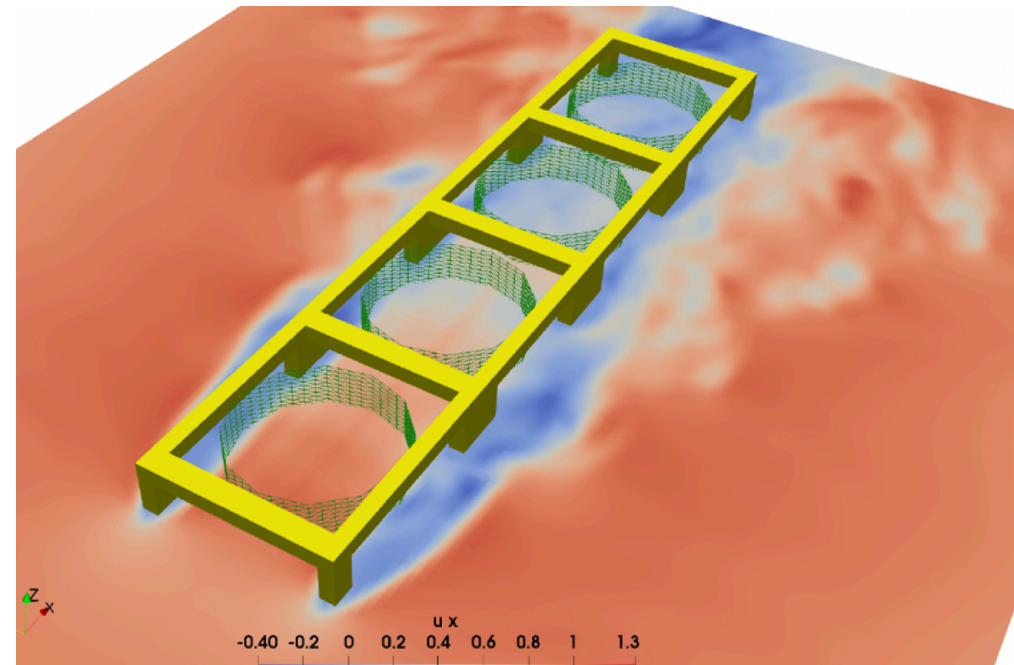
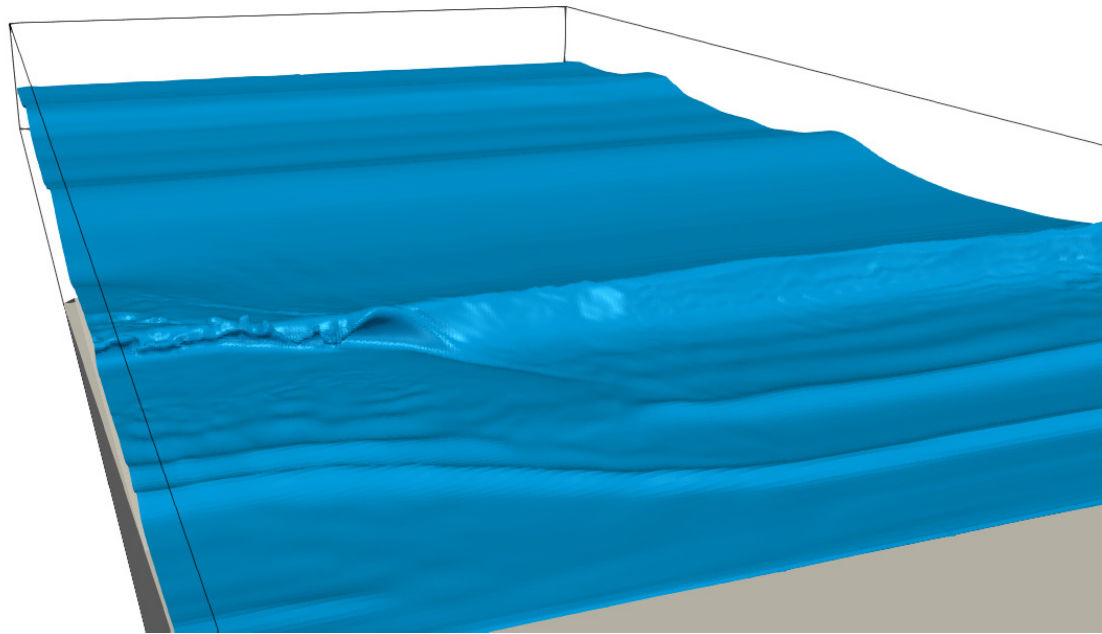
Motivation

Master thesis



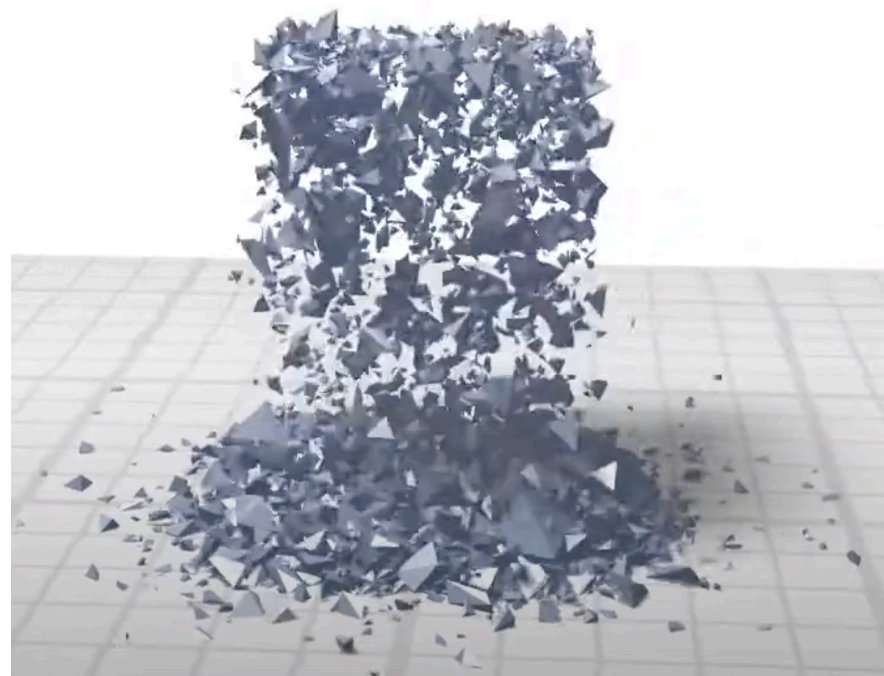
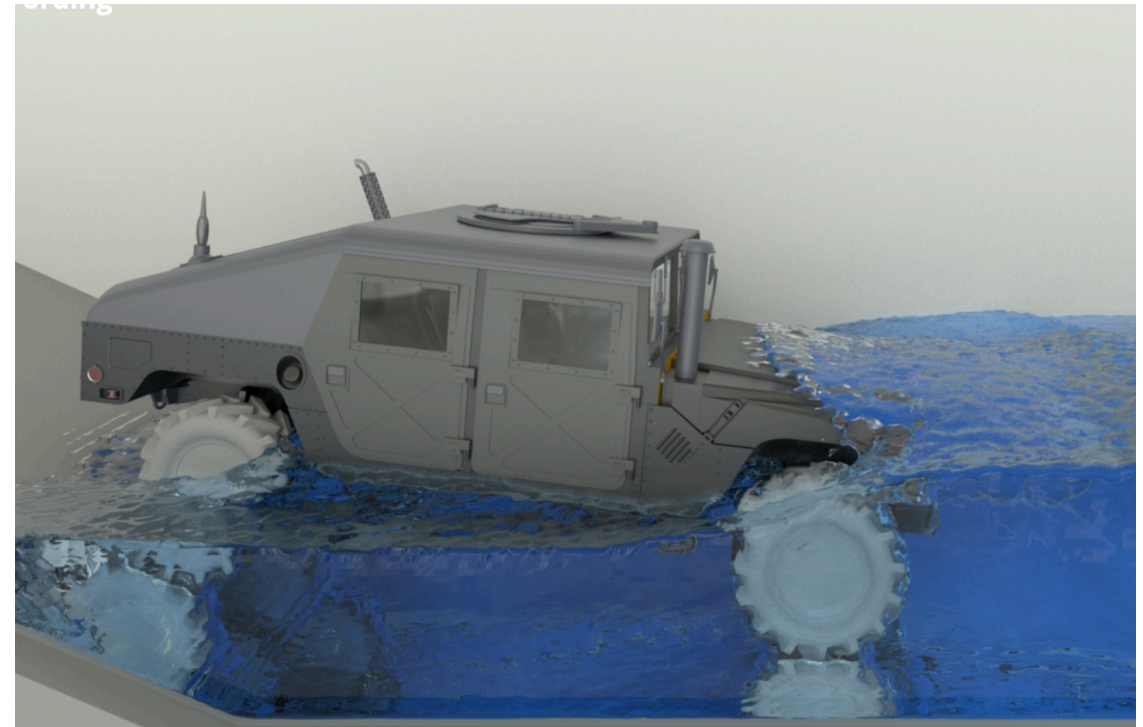
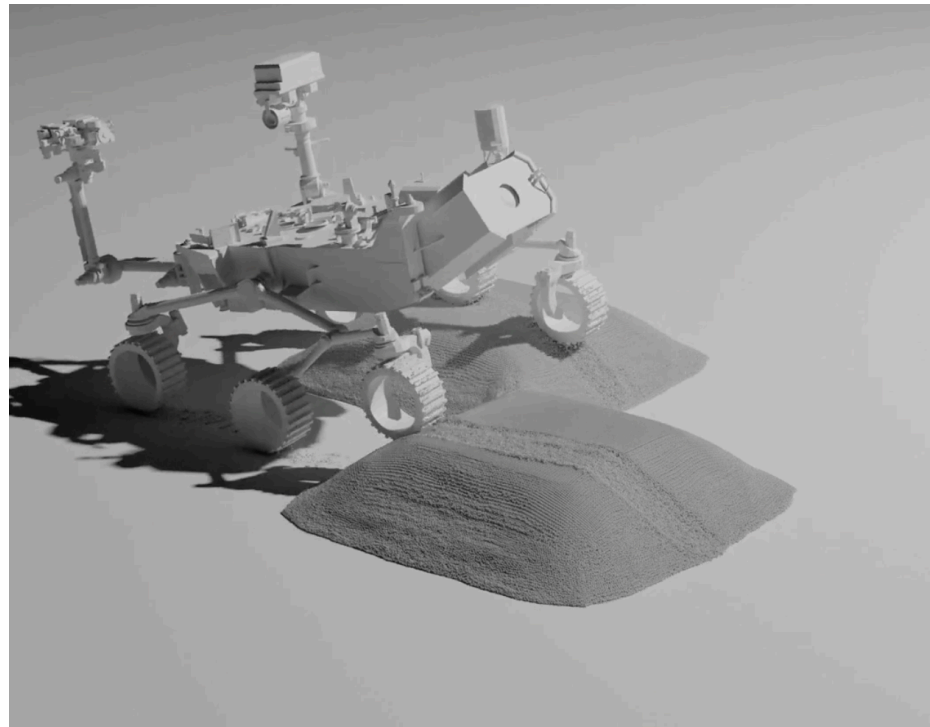
REEF3D

CFD framework



Project Chrono

Physics Engine framework



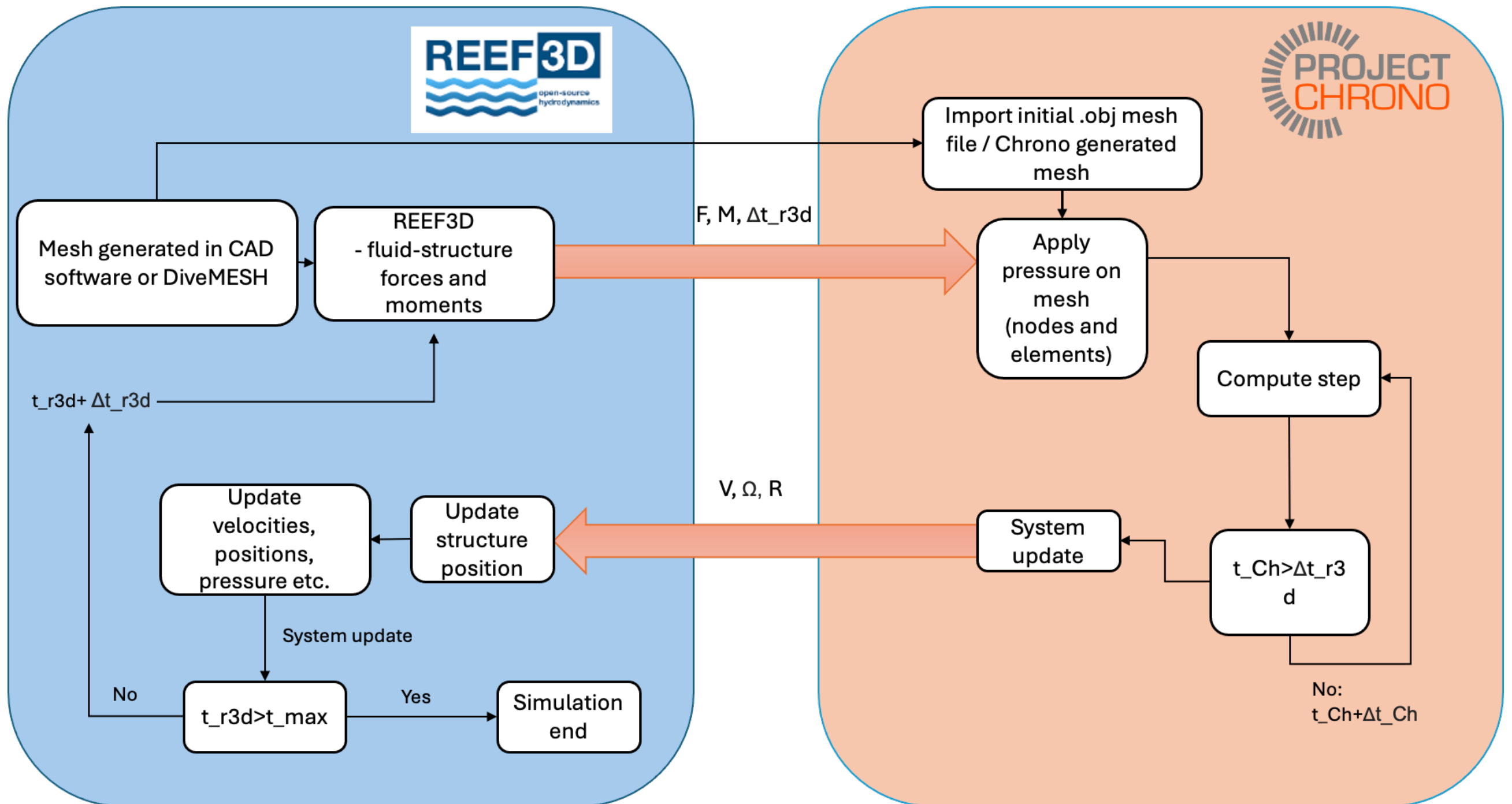
Topic

Master thesis

- Goal: Make a coupling between REEF3D and Chrono
- REEF3D - CFD -> Chrono
- dynamic FEA
- FSI
- REEF3D - Rigid



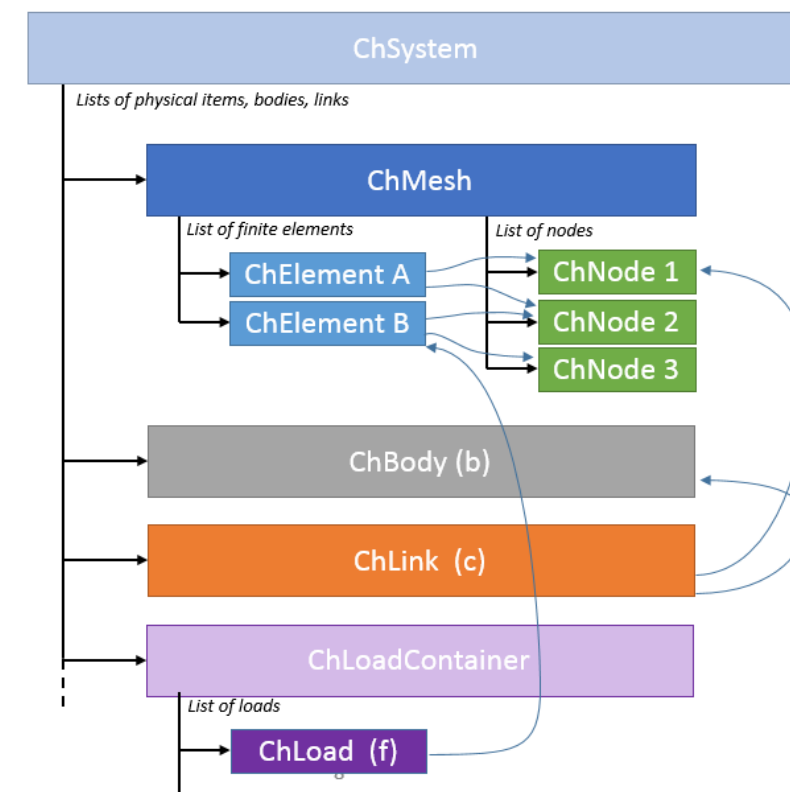
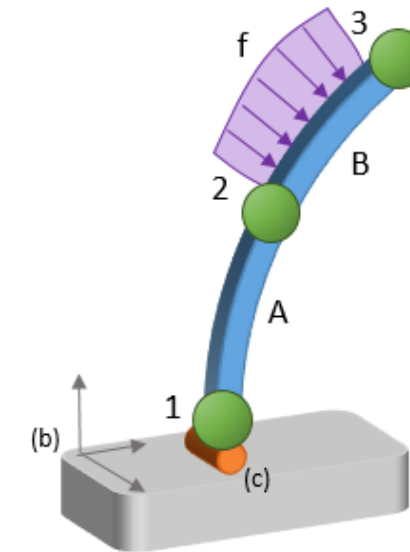
Coupling Principle



Chrono::FEA

FEA module

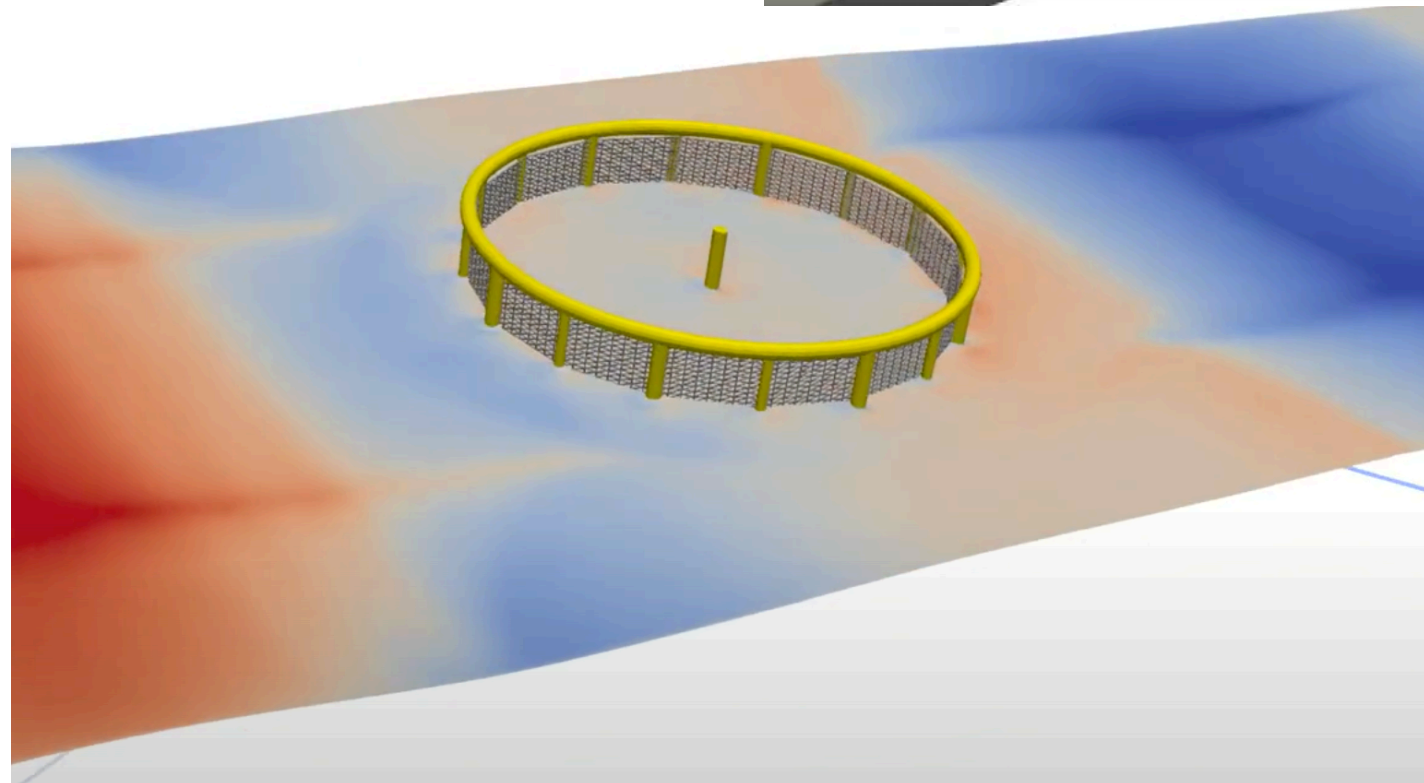
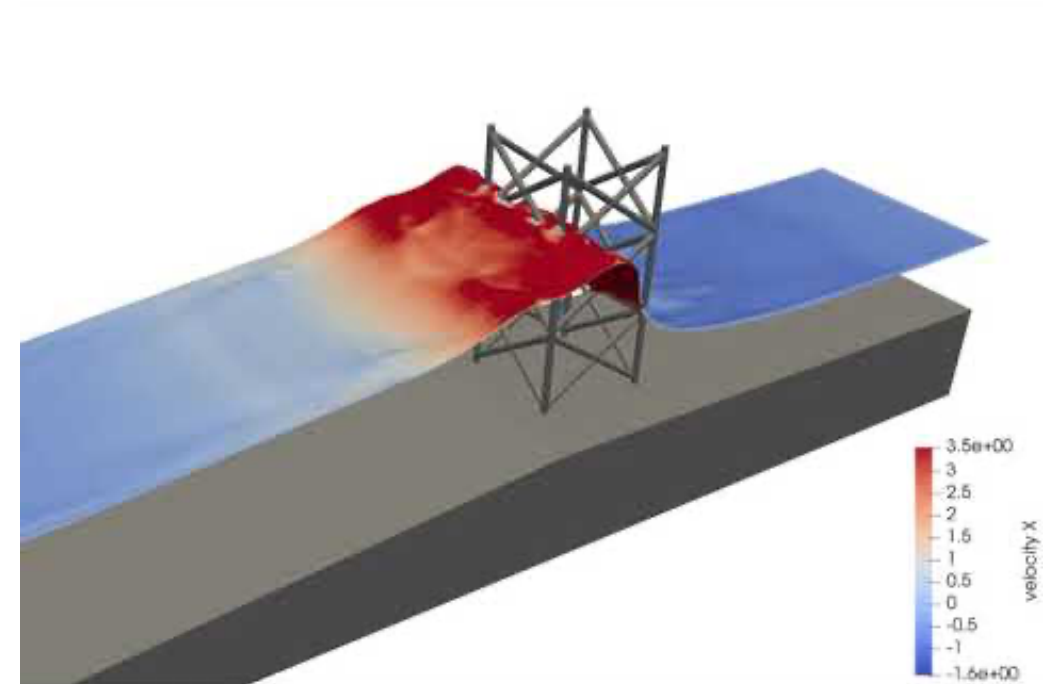
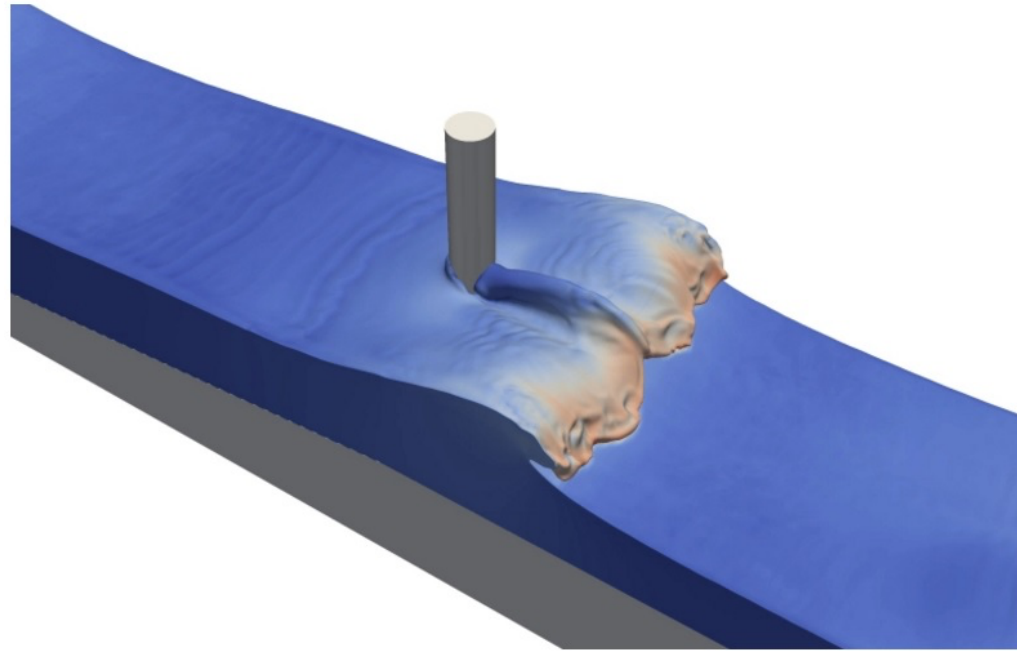
- Finite Elements:
 - Surface volume (ANCF)
 - Beam (EB)
 - Solid volume



Chrono FEA - https://api.projectchrono.org/manual_fea.html

REEF3D-Chrono

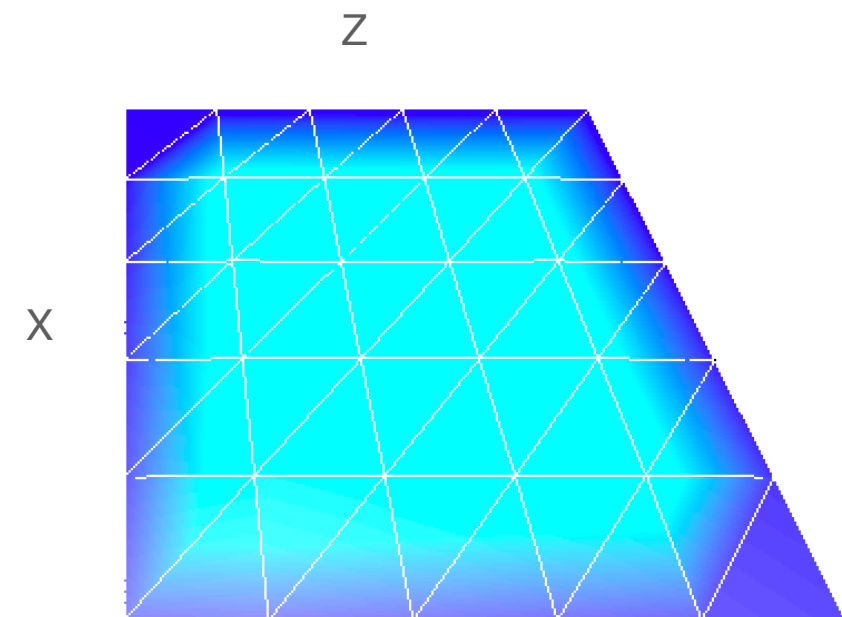
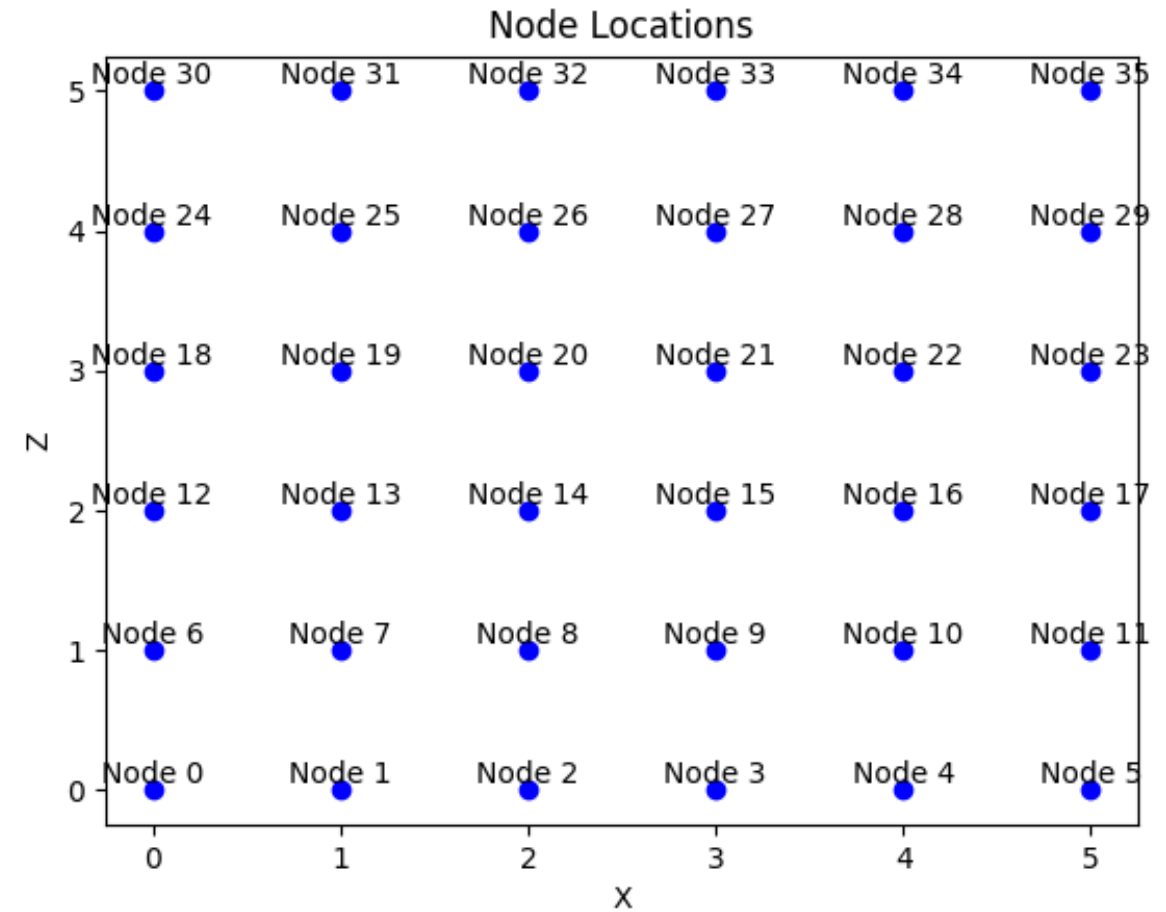
Usage



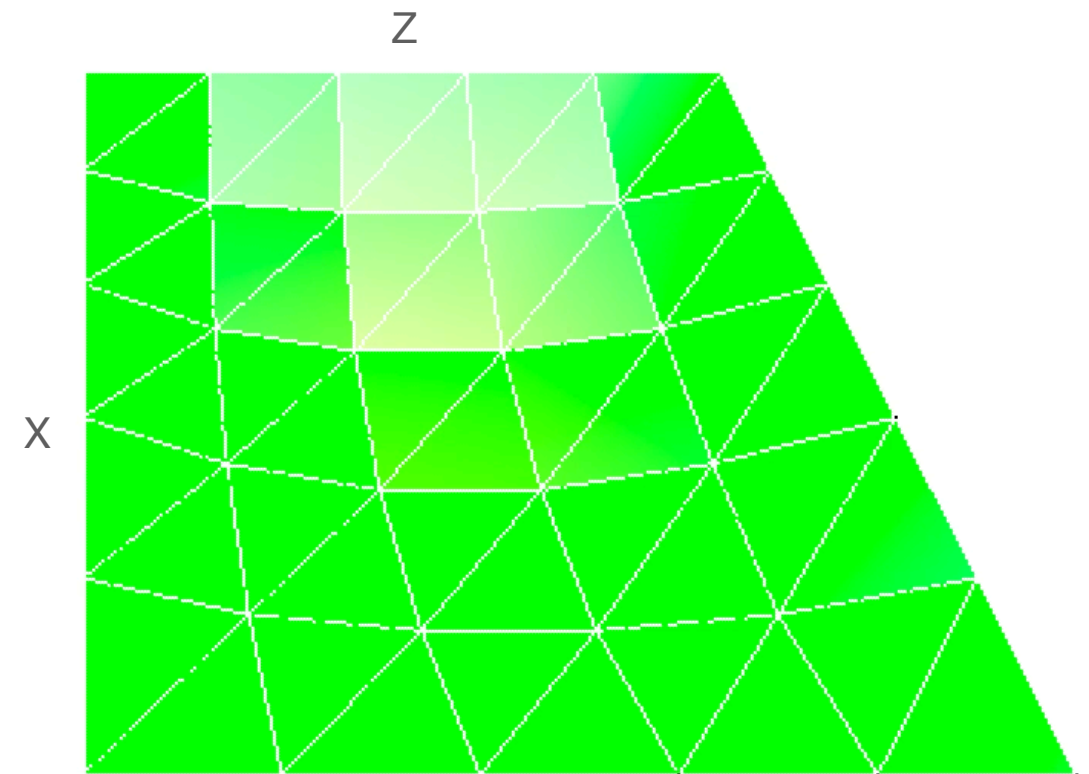
Membrane concept

ANCF_3423

- 4 node points - mesh
- Lower order - linear shape function
- Trans. + dir. derivative vector - global pos. Vector



- ChLoaderUV
- Pressure integration -> REEF3D
- Modified - oscillating pressure
- Increase resolution/higher order ANCF



References

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