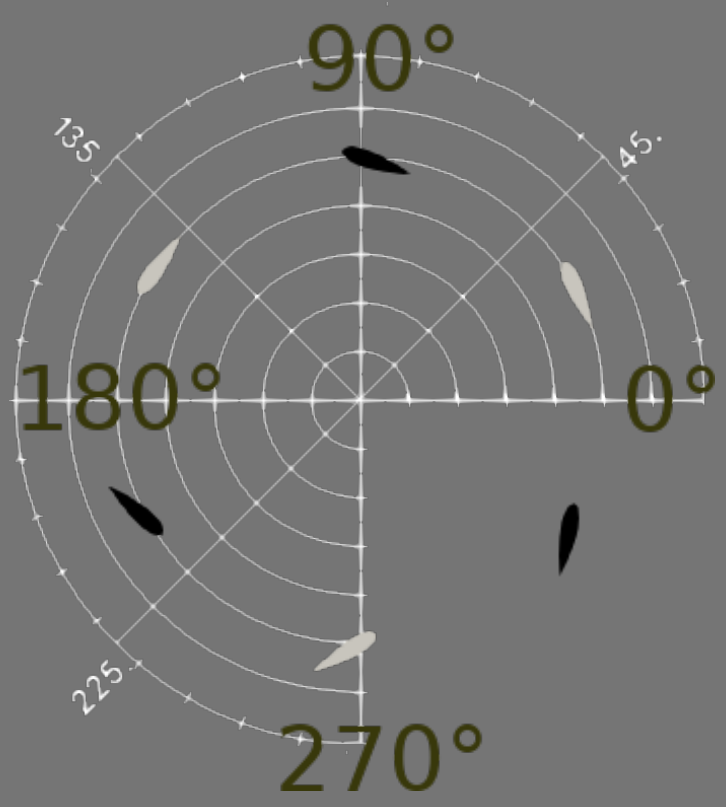
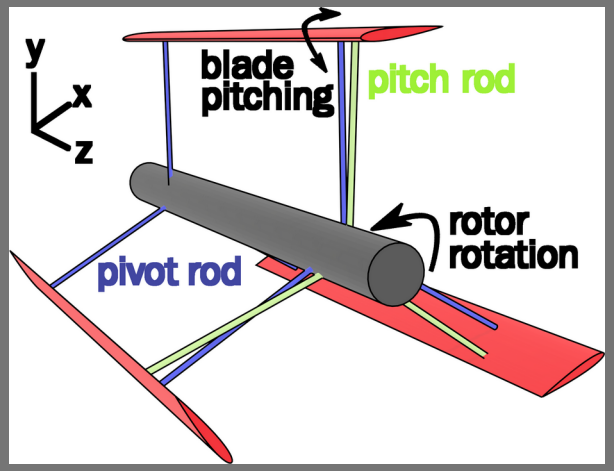
COMPARING SPEEDED-UP OVERSET TO AMI

(ADAPTED FROM AN INTERNAL PRESENTATION)

THE TESTCASE

- Reynolds ~ 100.000
- Mach < 0,3





$$\theta = \theta_o + \theta_s \sin(\omega t)$$

θ : local pitch angle

θ_o : top/bottom diff, 6°

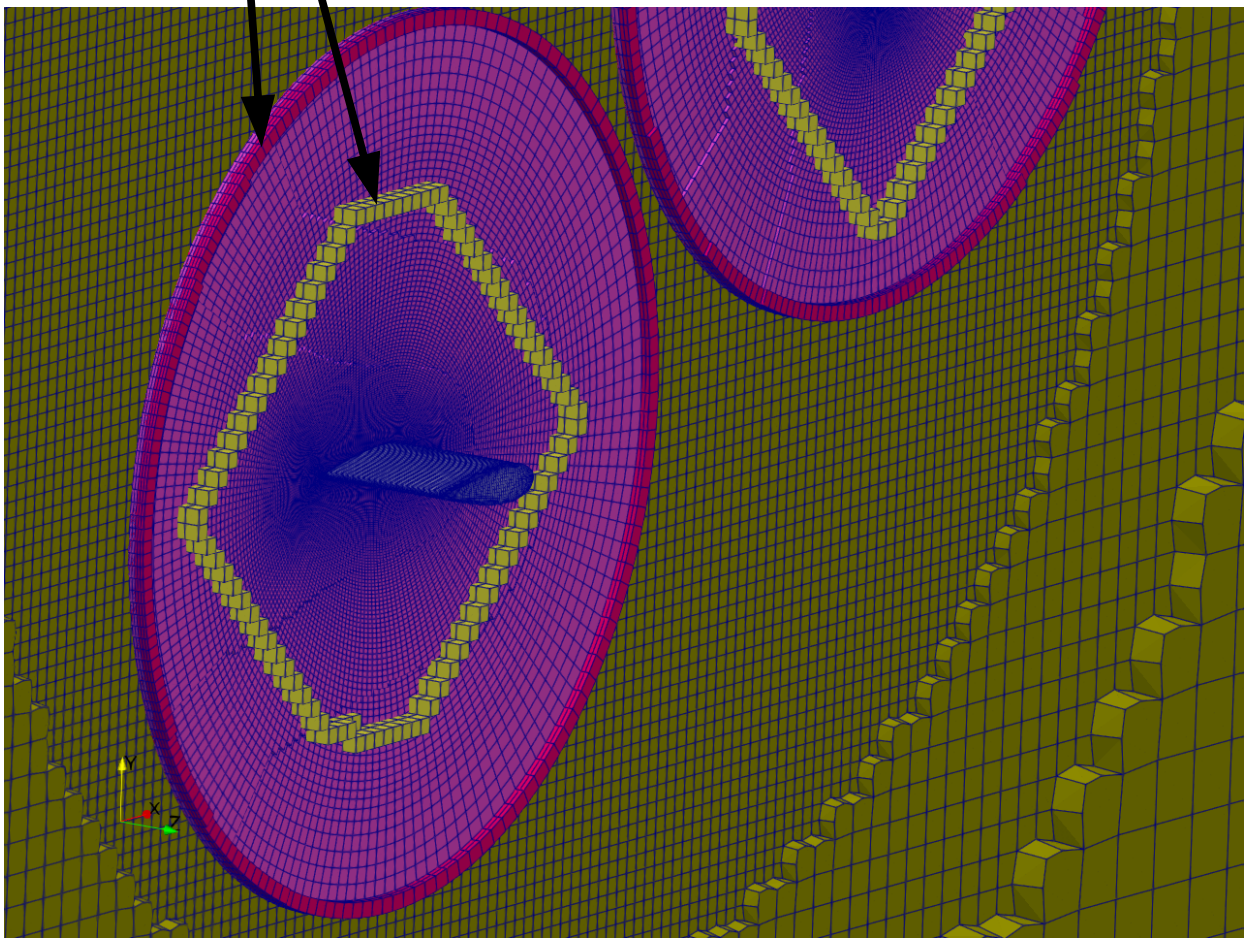
θ_s : pitch magnitude, 25°

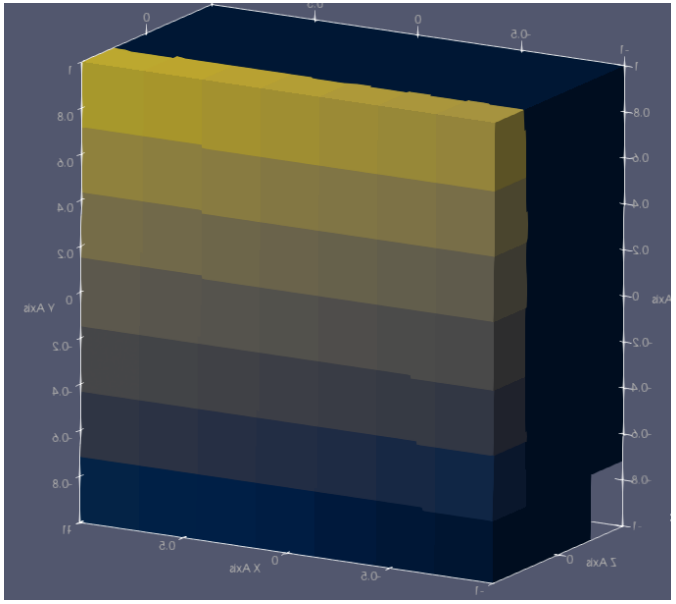
ω : rotor vel., 18.67 rad/s

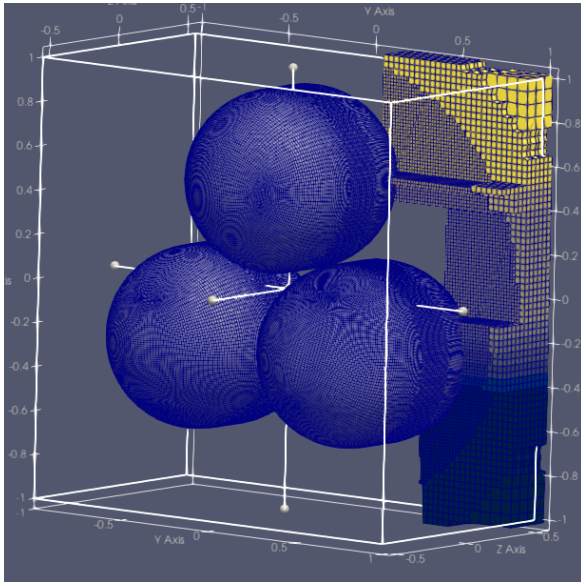
t : time. starting at 0°

MESH AND PROCESSOR DISTRIBUTION

Interpolated cells, animated version







related prior code modifications: https://develop.openfoam.com/Development/openfoam/-/issues/2106

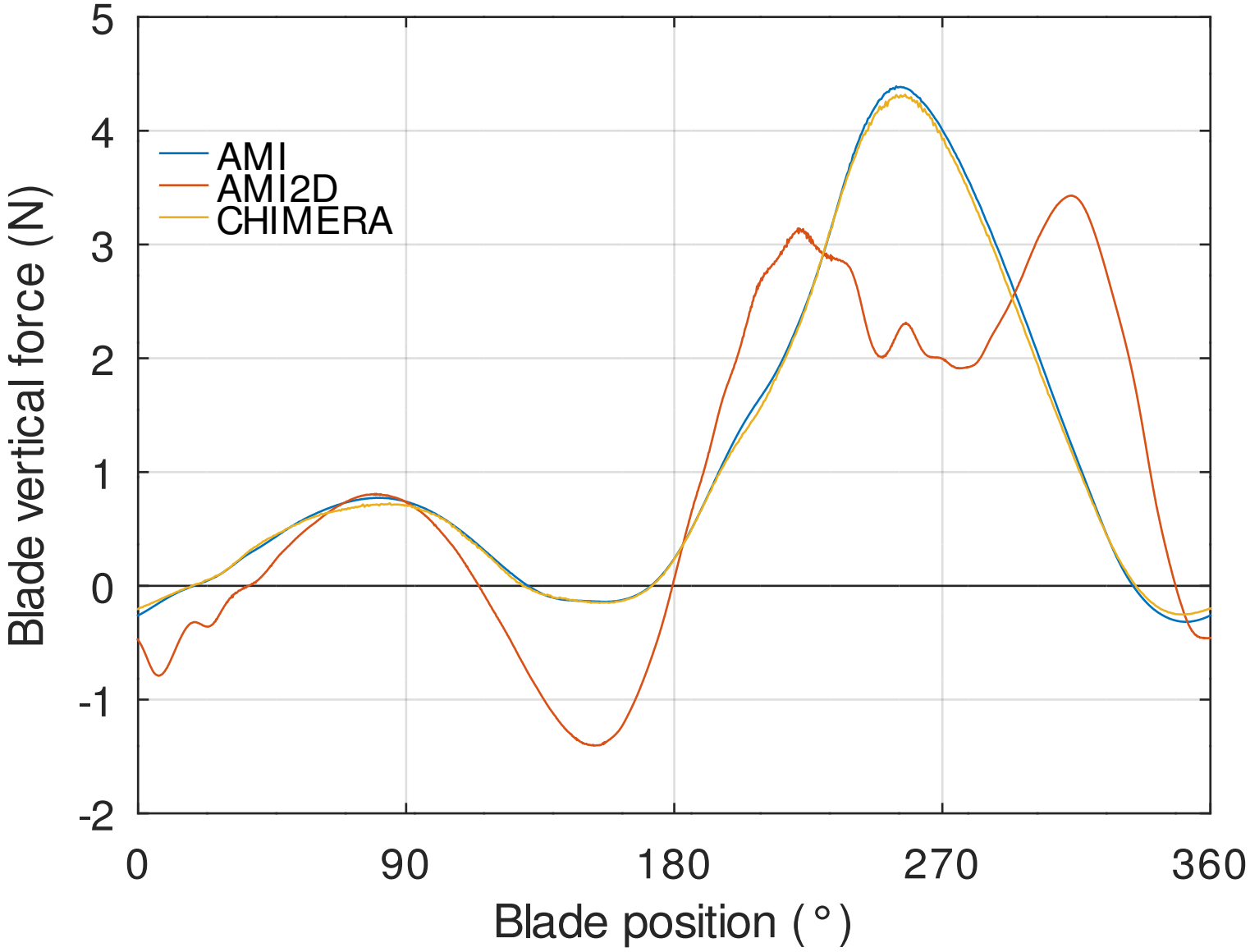
OVERSET COMPARISON

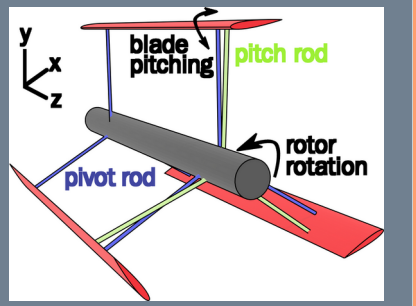
Method	Time for Overset alone per timestep (seconds)
cellVolumeWeight	**116** – 117
cellVolumeWeight with the splitted decomposition method (i.e.: myDecomposePar)	**9** – 11
inverseDistance with the splitted decomposition method and the modified search code	**2** – 3 (and 4 – 5 for complete timestep)

3.2 Million cells, 512 Processors, 1/3 Processor-Usage, 0.5° rotation per timestep, Hawk

RESULTATE – KRÄFTE

Note: AMI has final relaxation = 1.0 and CHIMERA = 0.9 (and 2D is a 2D case)





$\theta = \theta_o + \theta_s \sin(\omega t)$

θ : local pitch angle

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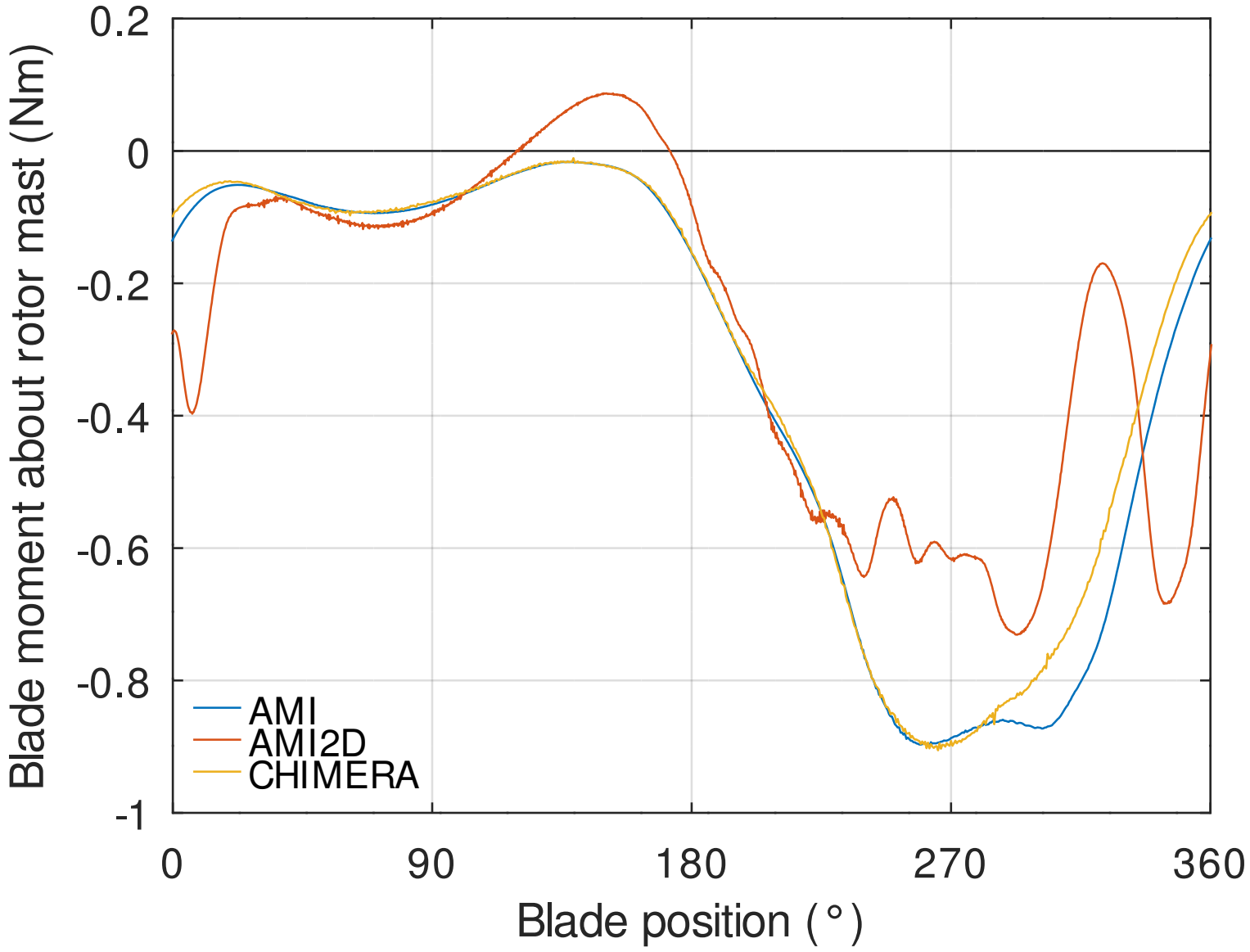
θ_s : pitch magnitude, 25°

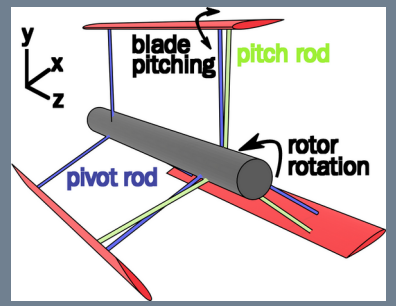
ω : rotor vel., 18.67 rad/s

t : time. starting at 0°

RESULTATE – LEISTUNG

Note: AMI has final relaxation = 1.0 and CHIMERA = 0.9 (and 2D is a 2D case)





$\theta = \theta_o + \theta_s \sin(\omega t)$

θ : local pitch angle

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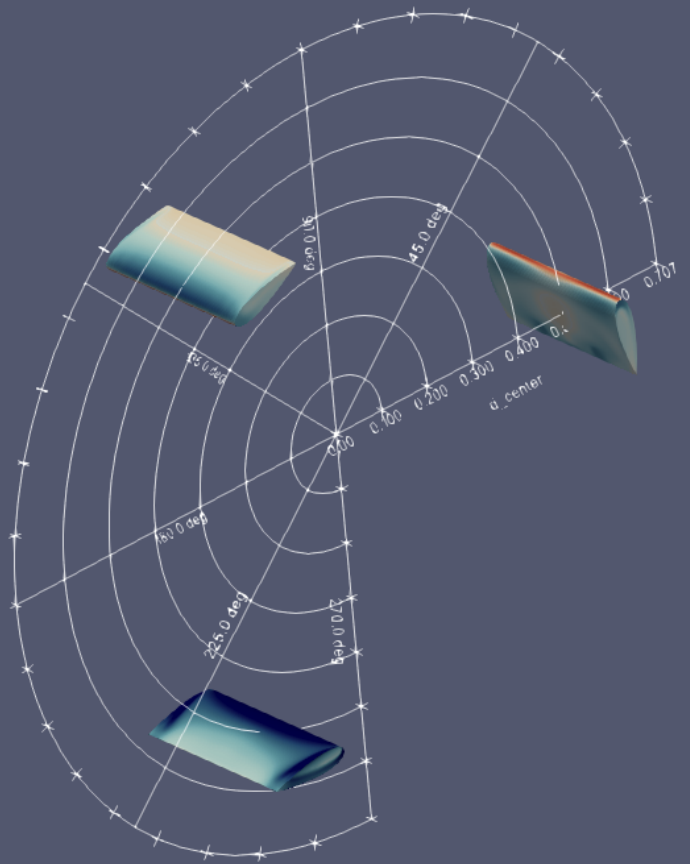
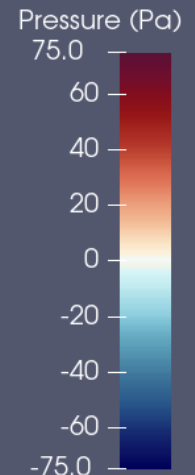
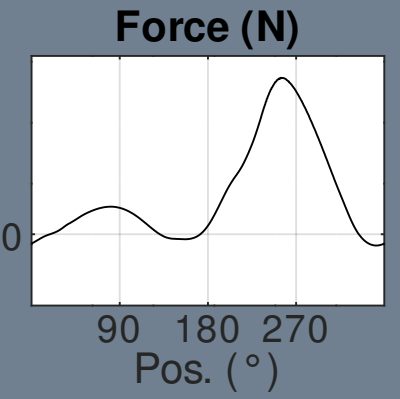
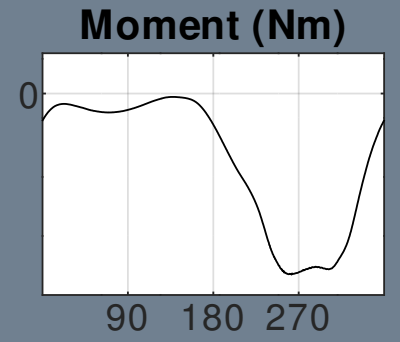
THE TESTCASE VIDEO

Video: here: http://louisgagnon.com/scBlog/rotor3DCFD.html
or directly on YouTube: https://youtu.be/q0pafX63_x0

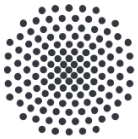








Angle: 5.0°



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