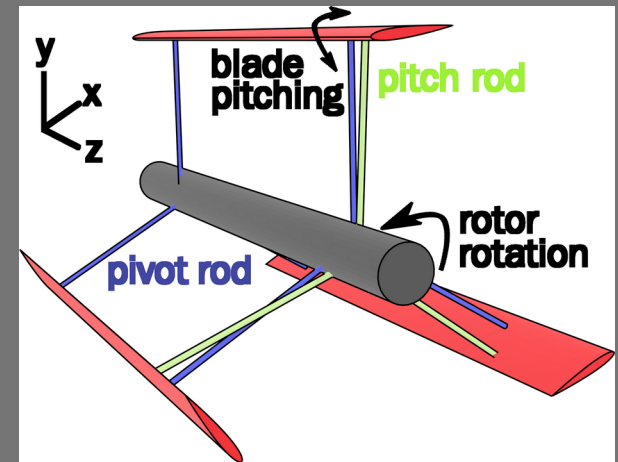
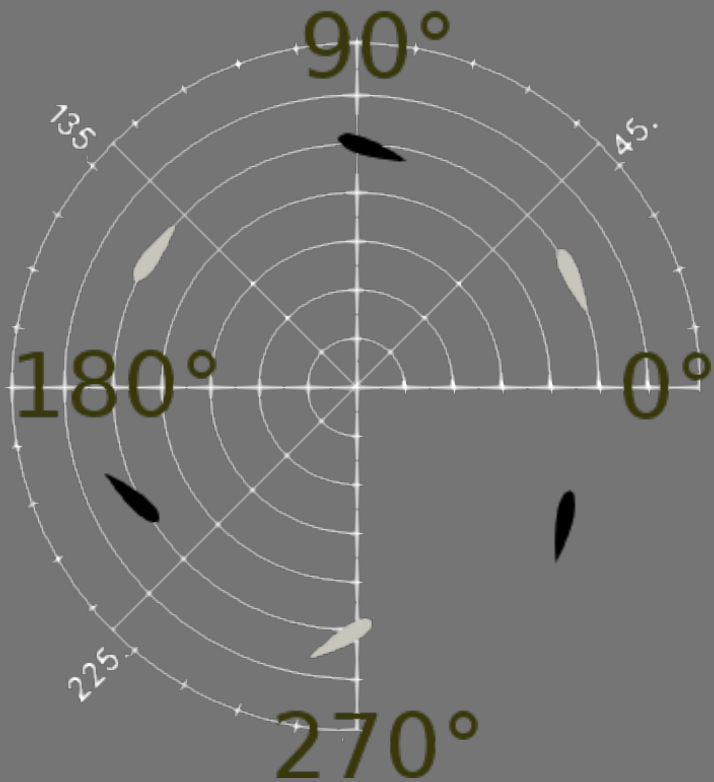
A 3D anatomical model of a heart and its major blood vessels. The heart is shown in a yellowish-tan color, with its four chambers and major arteries and veins. The vessels are shown in a greyish-blue color. The model is oriented with the heart at the top and the vessels extending downwards and outwards. The background is white.

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°

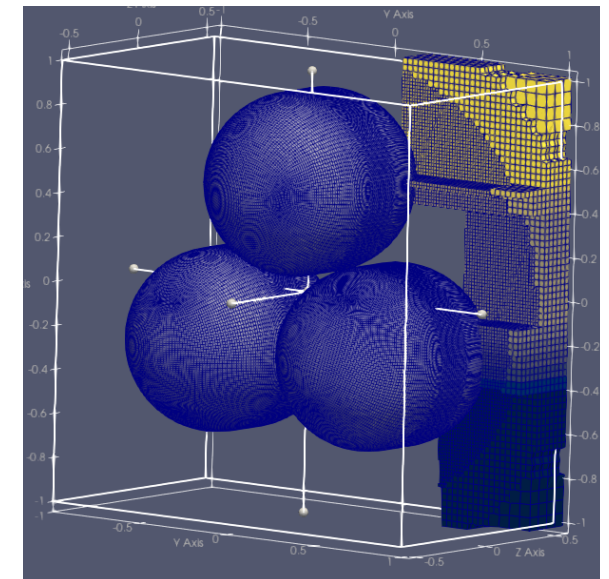
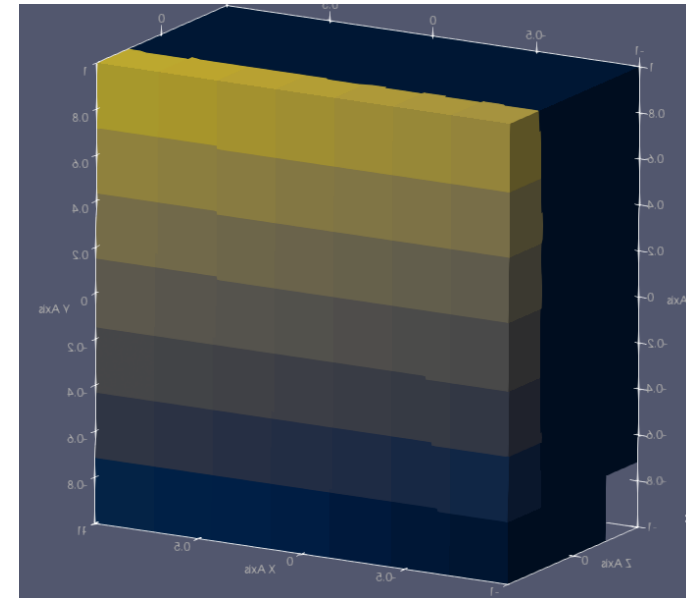
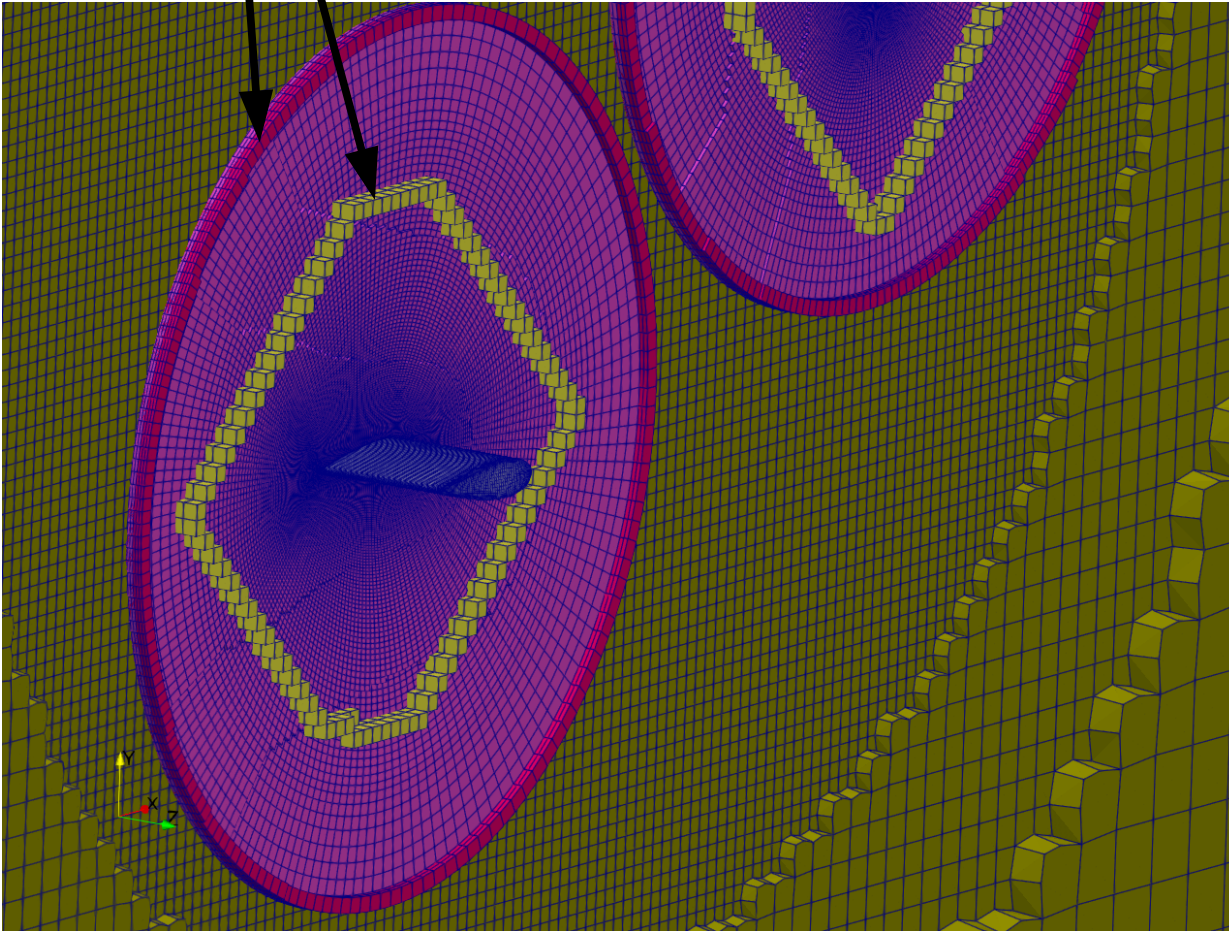
θ_s : pitch magnitude, 25°

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>

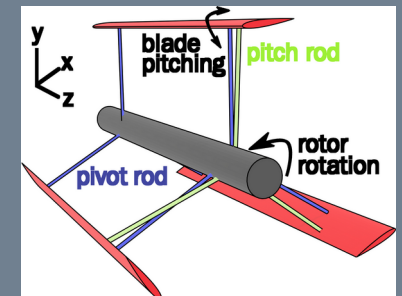
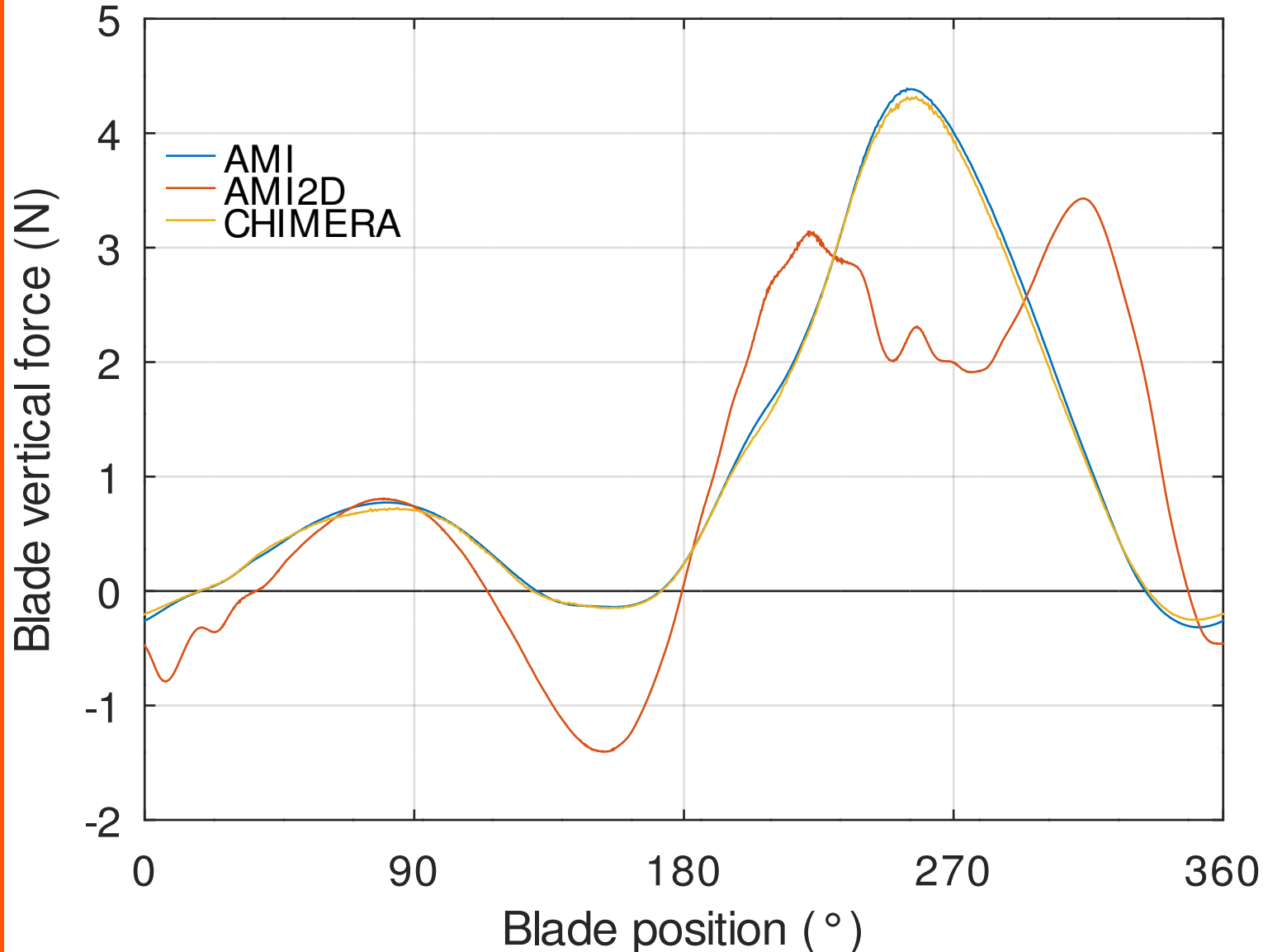
OVERSET COMPARISON

Method	Time for Overset alone per timestep (seconds)
<i>cellVolumeWeight</i>	116 – 117
<i>cellVolumeWeight with the splitted decomposition method (i.e.: myDecomposePar)</i>	9 – 11
<i>inverseDistance with the splitted decomposition method and the modified search code</i>	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

θ_o : top/bottom diff, 6°

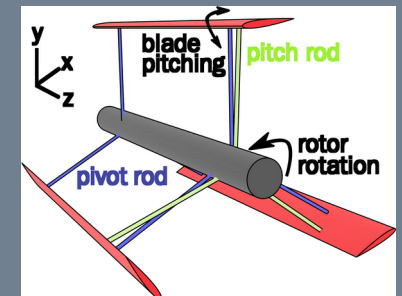
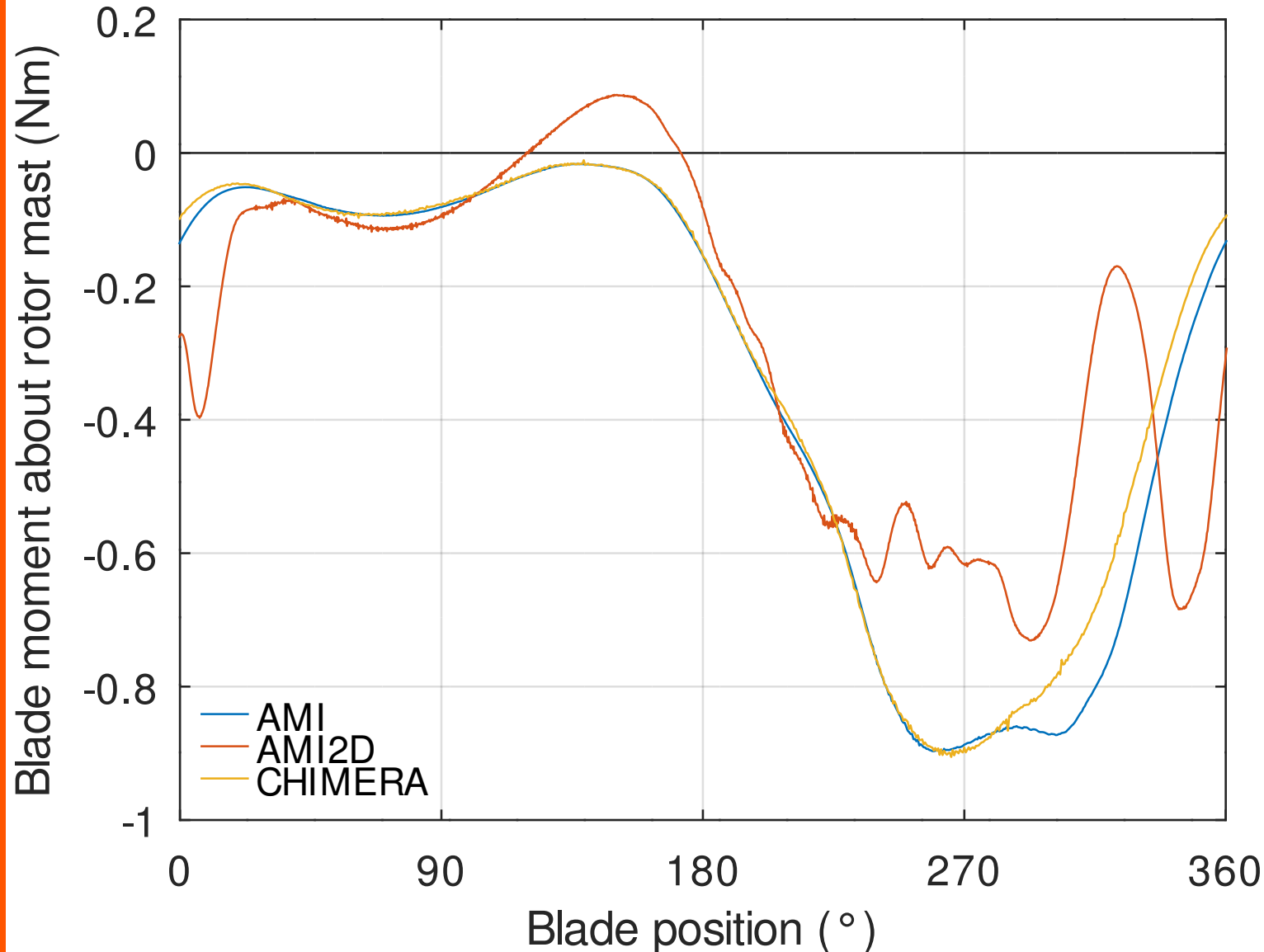
θ_s : pitch magnitude, 25°

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

θ_o : top/bottom diff, 6°

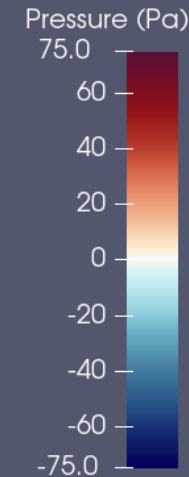
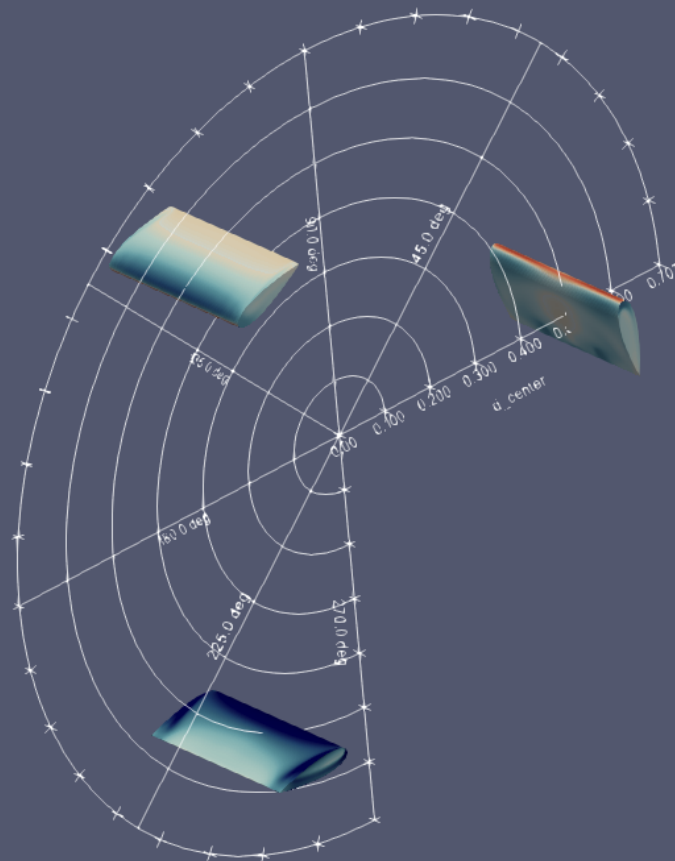
θ_s : pitch magnitude, 25°

ω : rotor vel., 18.67 rad/s

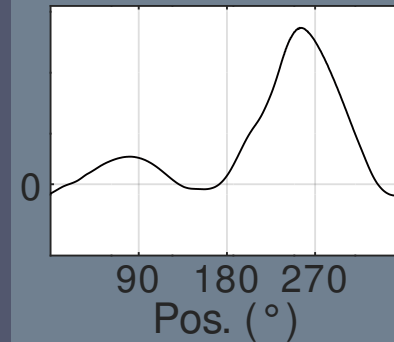
t : time. starting at 0°

THE TESTCASE VIDEO

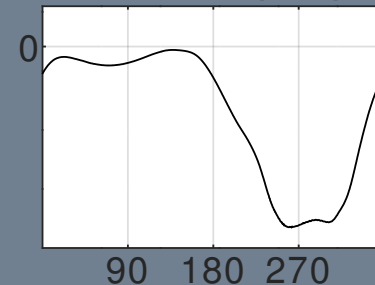
Video: here: <http://louiscagnon.com/scBlog/rotor3DCFD.html>
or directly on YouTube: https://youtu.be/q0pafX63_x0



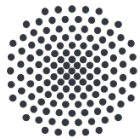
Force (N)



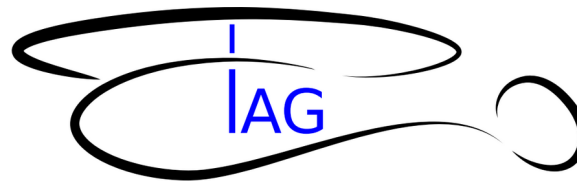
Moment (Nm)



Angle: 5.0°



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