

## Case 2: Geometry PPTC

### Propeller

The geometry is given in model scale.

Propeller diameter	D	[mm]	250.0000
Pitch at $r/R=0.7$	$P_{0.7}$	[mm]	408.7500
Pitch at $r/R=0.75$	$P_{0.75}$	[mm]	407.3804
Mean pitch	$P_{\text{mean}}$	[mm]	391.8812
Chord length at $r/R=0.70$	$C_{0.70}$	[mm]	104.1670
Chord length at $r/R=0.75$	$C_{0.75}$	[mm]	106.3476
Thickness at $r/R=0.75$	$t_{0.75}$	[mm]	3.7916
Pitch ratio	$P_{0.7}/D$	[-]	1.6350
Mean pitch ratio	$P_{\text{mean}}/D$	[-]	1.5675
Area ratio	$A_E/A_0$	[-]	0.7790
Skew	$\theta_{\text{eff}}$	[°]	18.8000
Hub diameter ratio	$d_h/D$	[-]	0.1500
Number of blades	$z$	[-]	5
Direction of rotation			right-handed (SCS)

- The propeller is a controllable pitch propeller. This affects the propeller blade design near the hub and results in a 0.3 mm gap between hub and propeller blade near the leading and trailing edge of the propeller..
- The trailing edge for the upper propeller radii is sharp.
- The propeller was designed to generate a tip vortex.
- Two coordinate systems are specified. The ship coordinate system (SCS) is used for the open water tests and corresponds to the usual coordinate system. For the velocity measurements (LDV) a second coordinates system was introduced, the propeller coordinate system (PCS). The intention was to measure the axial velocities inline with the positive x-axis and thereby obtain positive axial velocities. Which coordinate system is used will be specified.

### Hub cap

Different hub cap geometries are provided. The hub caps differ whether they are employed in a pull or push arrangement. The hub cap geometry is provided with the propeller geometry for the specific test cases.

**Ship coordinate system (SCS)**

The ship coordinate system is an orthogonal right-handed system, with the x-axis pointing upstream and the z-axis upwards. The SCS is employed for the open water tests.

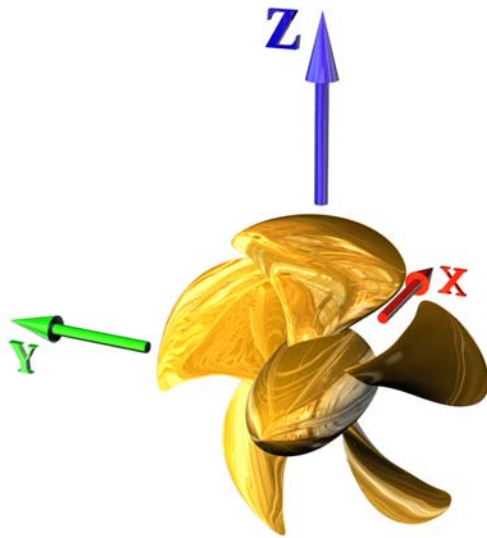


Fig. 1: Ship coordinate system

**Propeller coordinate system (PCS)**

An orthogonal coordinate system is used for the propeller, with the x-axis pointing downstream and the z-axis upwards. Please note, that the direction of rotation is defined in the ship coordinate system.

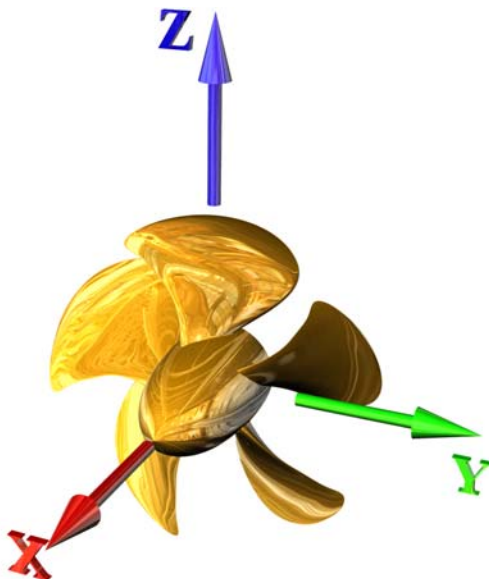


Fig. 2: Propeller coordinate system