Test Case 1b.1:Static Rudder

Conditions

- Towing condition in still water
- Pitch and heave free; roll fixed
- With rudder
- With Propeller

F_n [-]	R_n [-]	$L_{PP}[m]$	U_c [m/s]	n [rps]	β [deg]	δ [deg]
0.142	4.6×10^6	5.52	1.047	8.59	0.0	$0.0, 10.0$

Items and Remarks

Items	Remarks
Integral variables: Non-dimensionalized coefficients of X-force (X') Y-force (Y') Yaw-moment (N') Thrust force (T'_x) Rudder X-force (R'_x) Rudder Y-force (R'_y) and Uncertainty analysis(U_{SN}, U_V, E)	Experimental results are available

- Coordinate system for comparisons is fixed to midship on the undisturbed water plane. (see Figure 1)
- Froude number F_n and Reynolds number R_n are defined using towing carriage speed (U_c) and length between perpendiculars (L_{PP}):

$$F_n = \frac{U_c}{\sqrt{g \cdot L_{PP}}}, \quad R_n = \frac{U_c \cdot L_{PP}}{\nu}$$

  where g is the gravitational acceleration and ν is the kinematic viscosity.
- n is the propeller revolution rate [rps] and β and δ are drift angle [deg] and rudder angle [deg], respectively.
- All CFD predicted force coefficients should be reported using the provided ship length L_{PP}, mean draft T_m and ship speed U. Force coefficients are defined as follows:

$$X' = \frac{X}{\frac{1}{2}\rho U^2 L_{PP} T_m}, \quad Y' = \frac{Y}{\frac{1}{2}\rho U^2 L_{PP} T_m}, \quad N' = \frac{N}{\frac{1}{2}\rho U^2 L_{PP}{}^2 T_m}$$
$$T'_x = \frac{T}{\frac{1}{2}\rho U^2 L_{PP} T_m}, \quad R'_x = \frac{R_X}{\frac{1}{2}\rho U^2 L_{PP} T_m}, \quad R'_y = \frac{R_Y}{\frac{1}{2}\rho U^2 L_{PP} T_m}$$

  where N' is the yaw-moment around the origin of the coordinates.

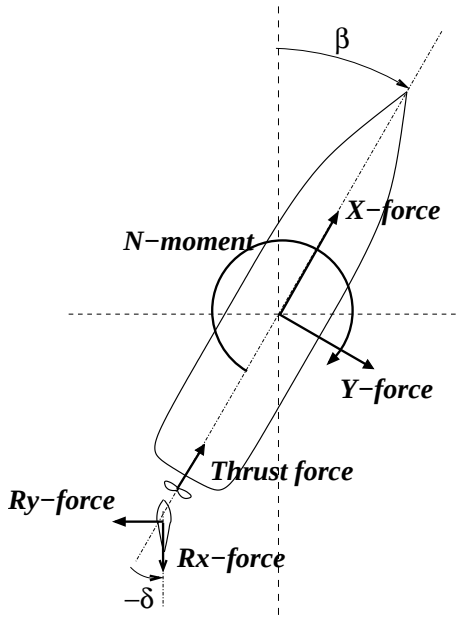

Figure 1: Coordinate system for hydrodynamic forces and moment