

Fig. 1 Lines of Ship A-1

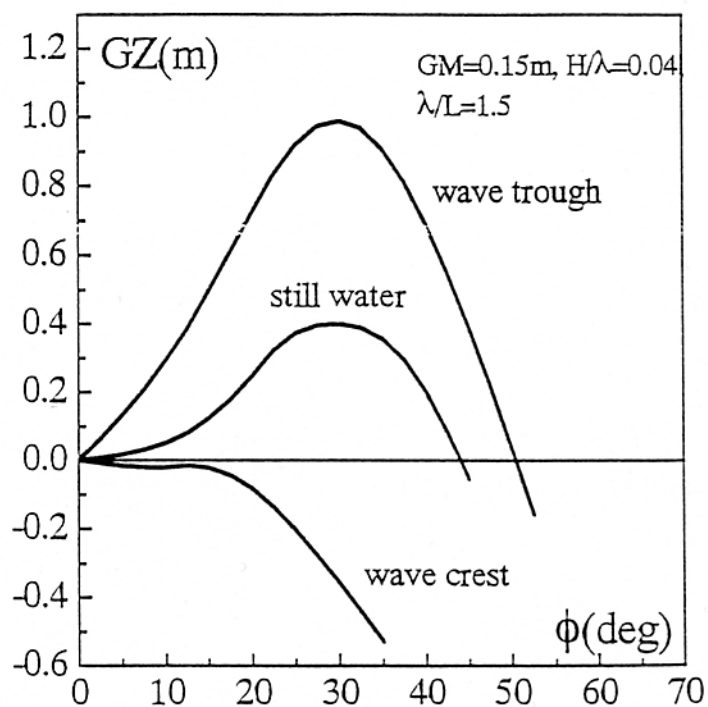
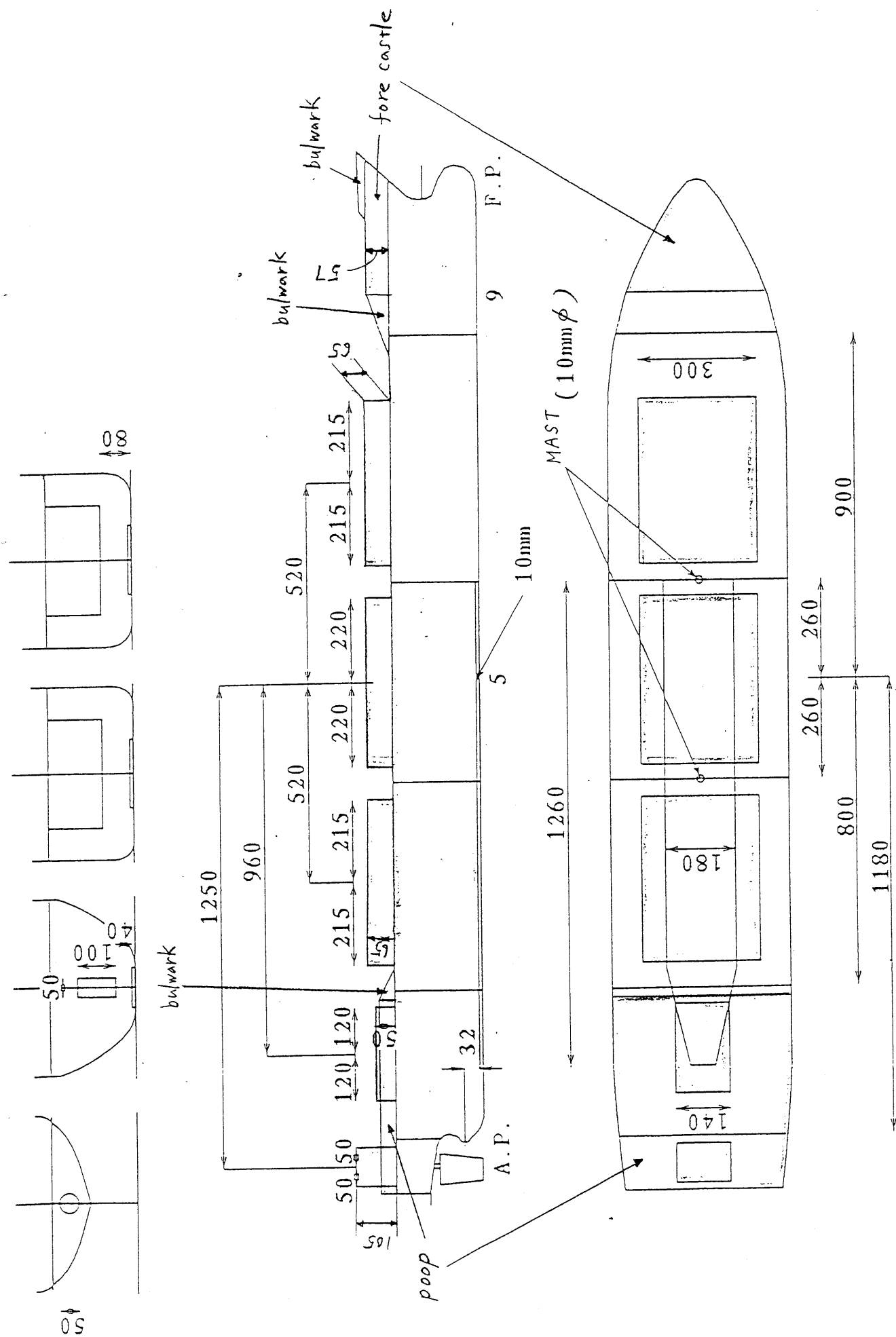


Fig. 2 Calculated righting arm curves of Ship A-1 in still water , wave trough and crest in full scale



experiment

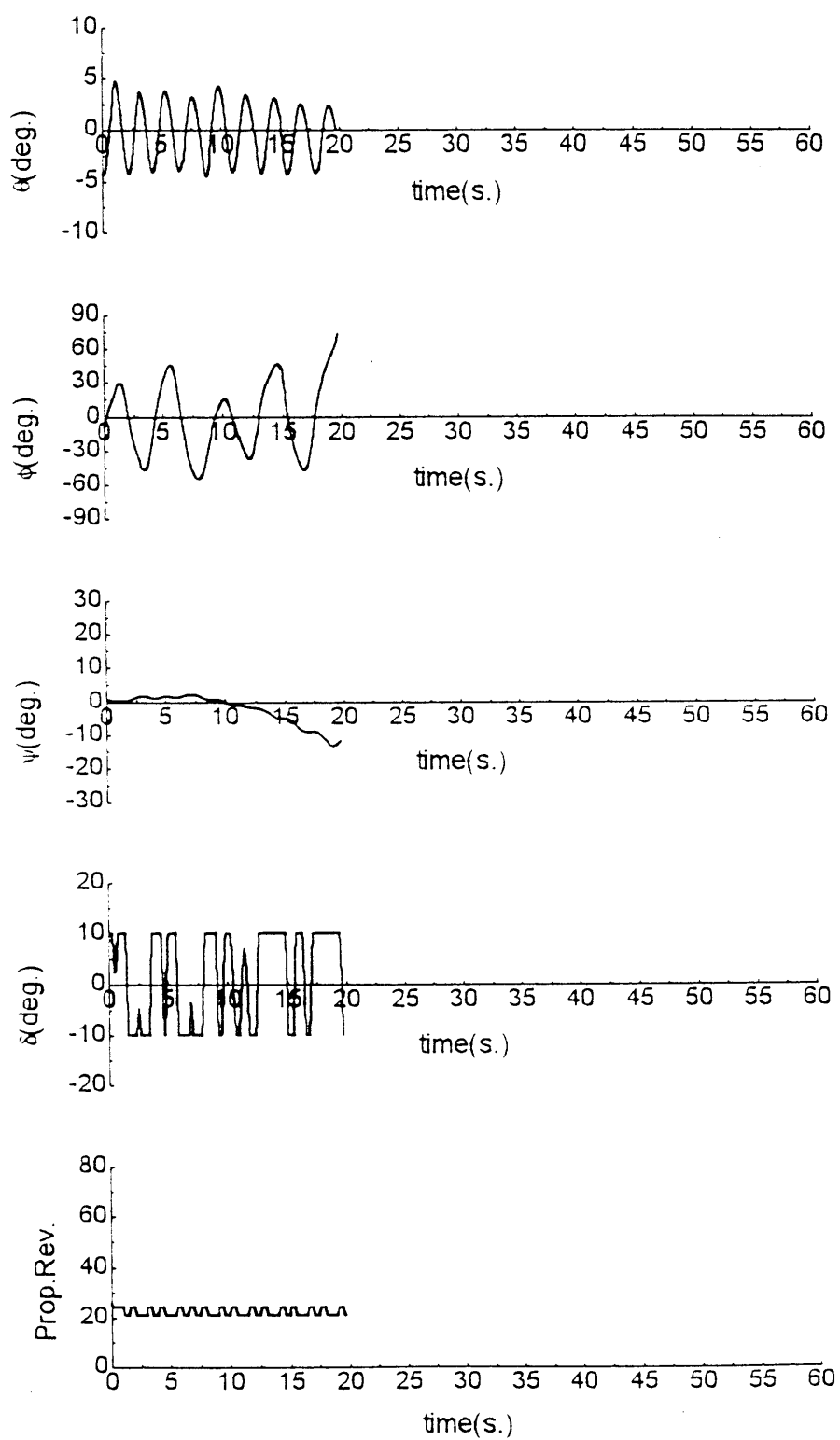


Fig. 4 Measured time history of the free-running model run of the ship A-1 in model scale ($\lambda/L_{pp}=1.5$ $H/\lambda=1/25$, $F_n=0.2$ $\chi_c=0$ degrees)

experiment

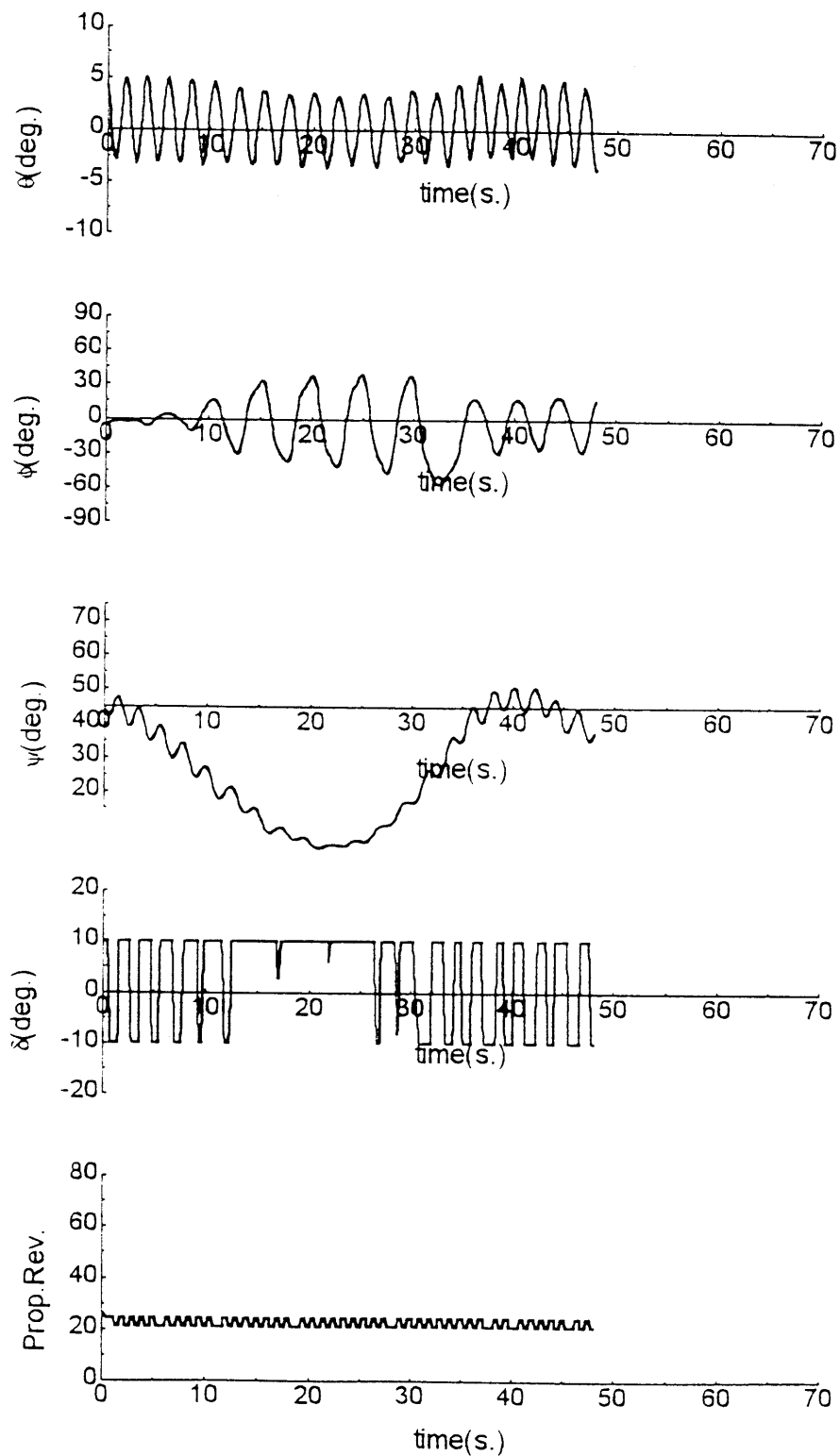


Fig. 5 Measured time history of the free-running model run of the ship A-1 in model scale ($\lambda/L_{pp}=1.5$ $H/\lambda=1/25$, $F_n=0.2$ $\chi_c=45$ degrees)

experiment

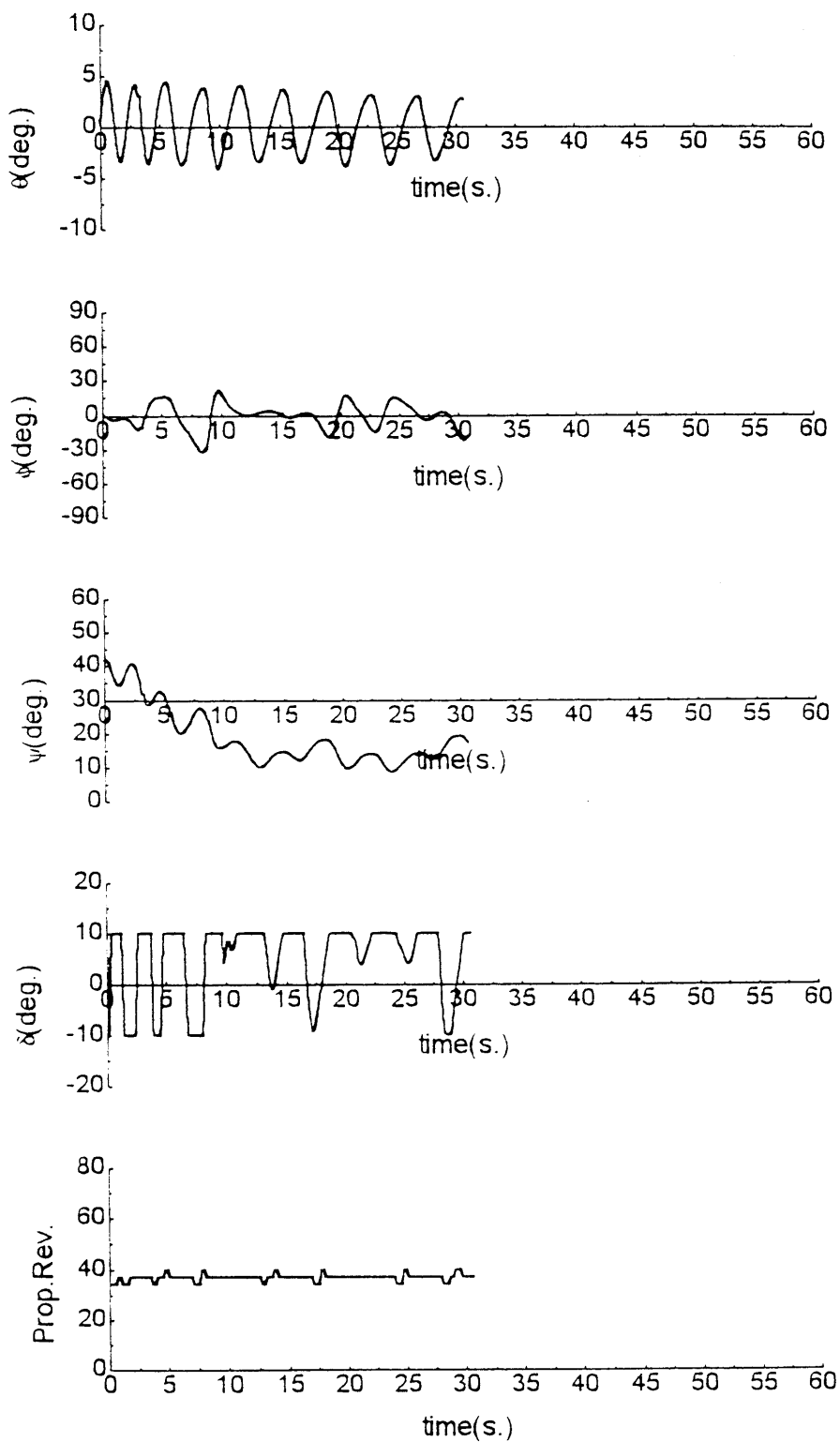


Fig. 6 Measured time history of the free-running model run of the ship A-1 in model scale ($\lambda/L_{pp}=1.5$ $H/\lambda=1/25$, $F_n=0.3$ $\chi_c=30$ degrees)

experiment

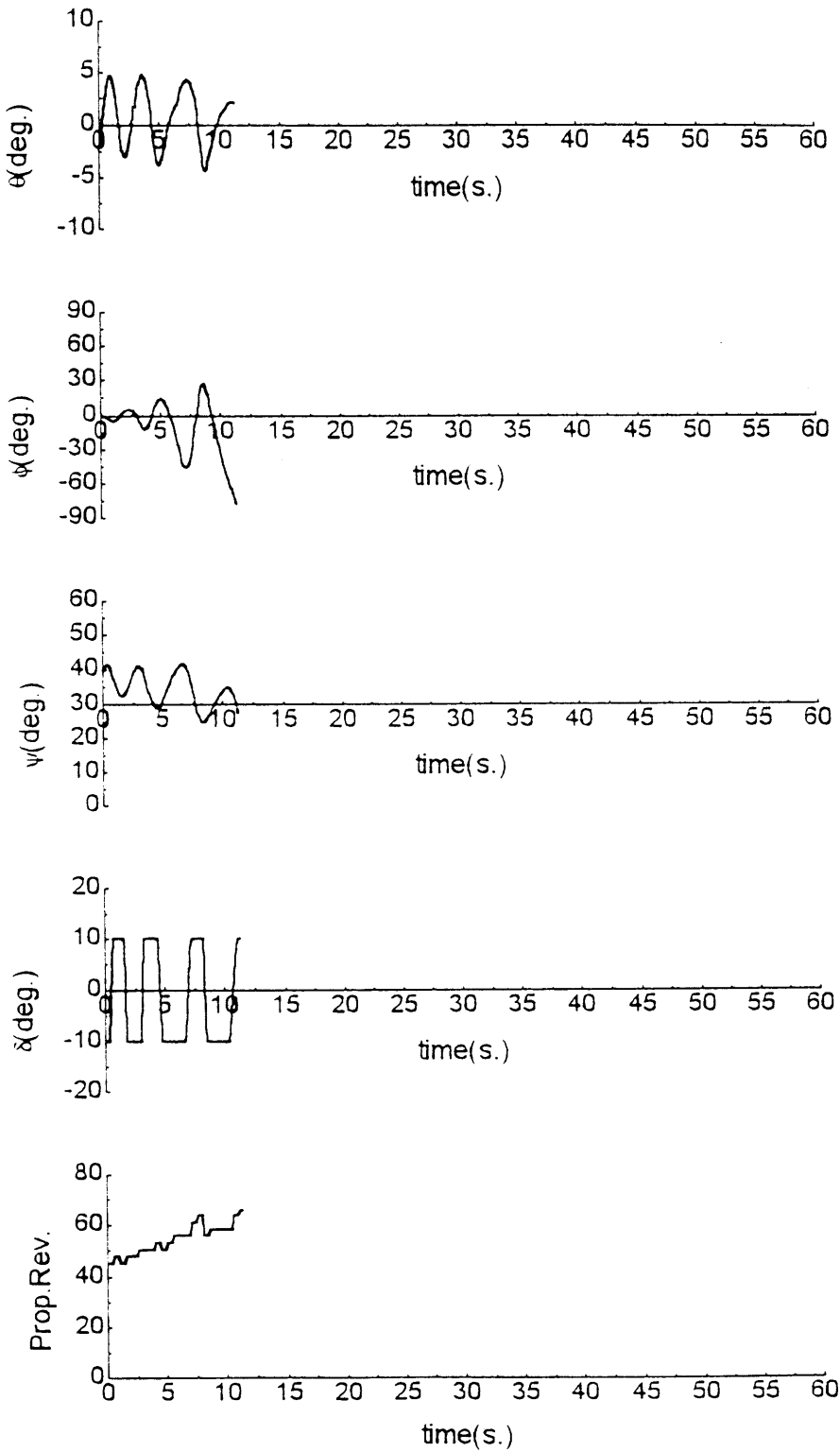


Fig. 7 Measured time history of the free-running model run of the ship A-1 in model scale ($\lambda/L_{PP}=1.5$ $H/\lambda=1/25$, $F_n=0.4$ $\chi_c=30$ degrees)

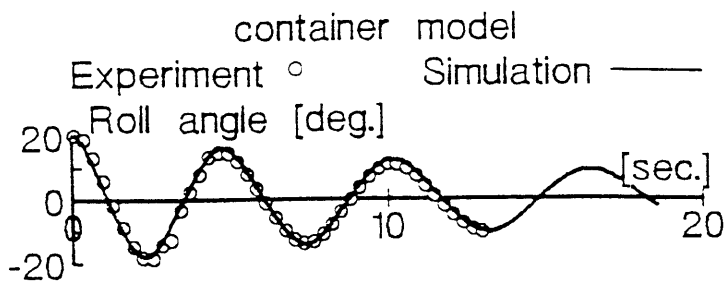


Fig. 8 Roll decay test of the ship A-1 in model scale without forward velocity

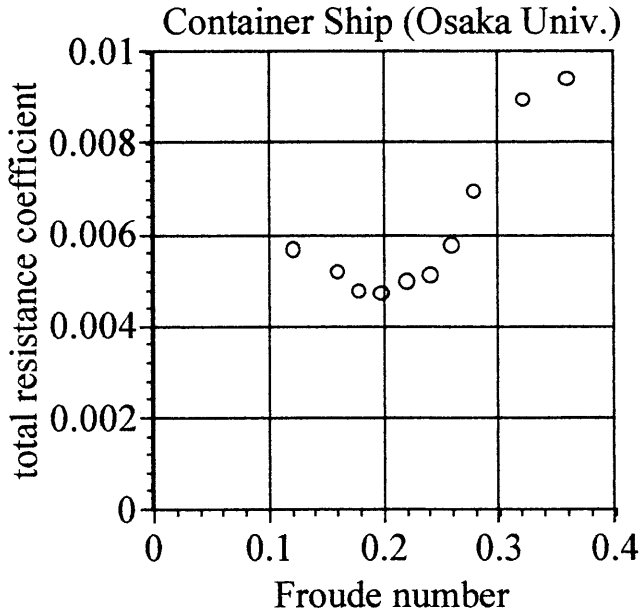


Fig. 9 Measured total resistance coefficient, C_T , as the function of the Froude number, F_n , obtained from the resistance test of the ship A-1

$$C_T = \frac{R}{\frac{1}{2} \rho U^2 S} \quad F_n = \frac{U}{\sqrt{L_{PP} g}}$$

where R : ship resistance and U : ship forward velocity.

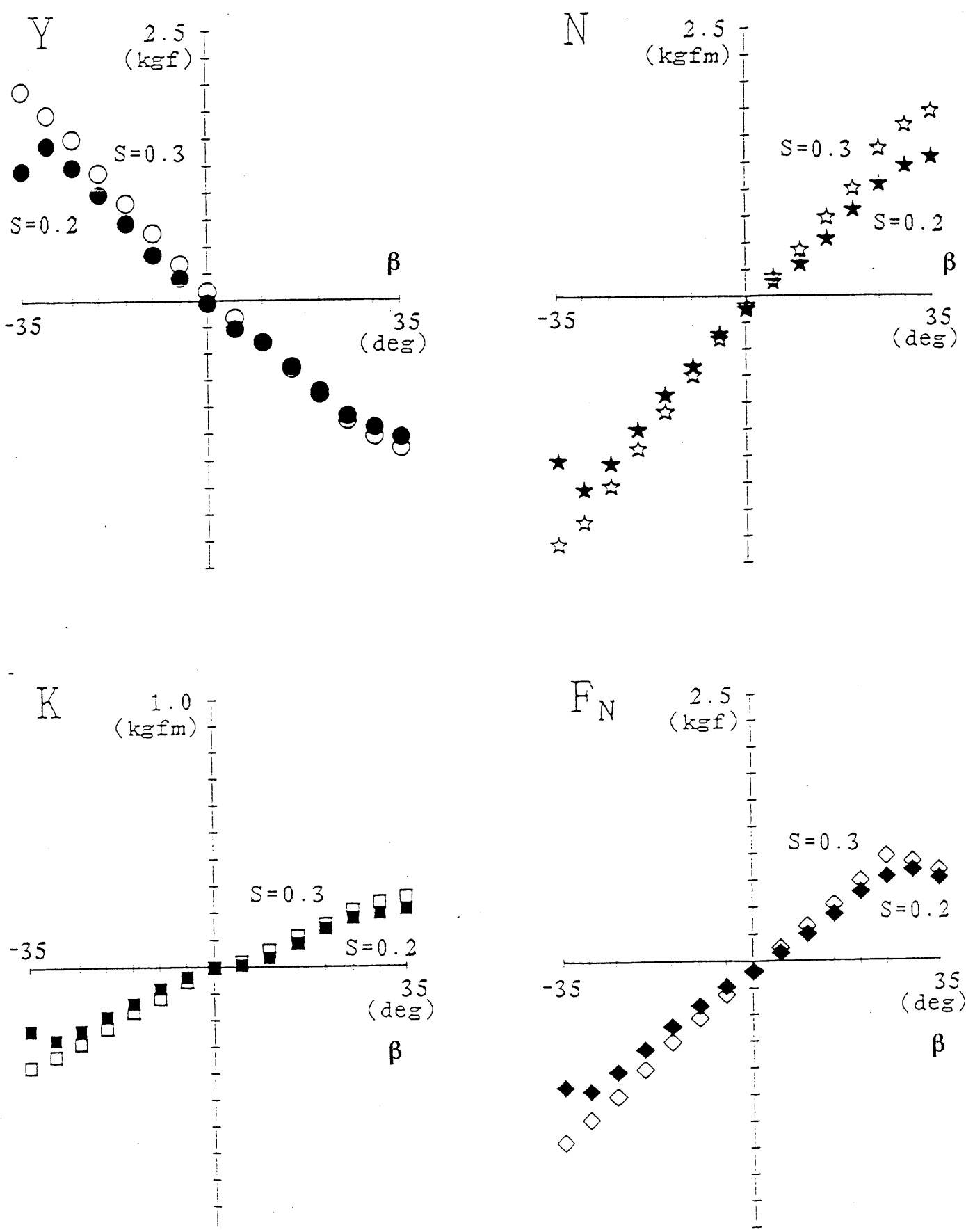


Fig. 10 Results of the rudder angle tests of the ship A-1 at $Fn=0.242$ in model scale
 where s : the propeller slip ratio ($s = 1 - U_A / (nP)$), U_A : propeller advance
 velocity, ρ : water density.

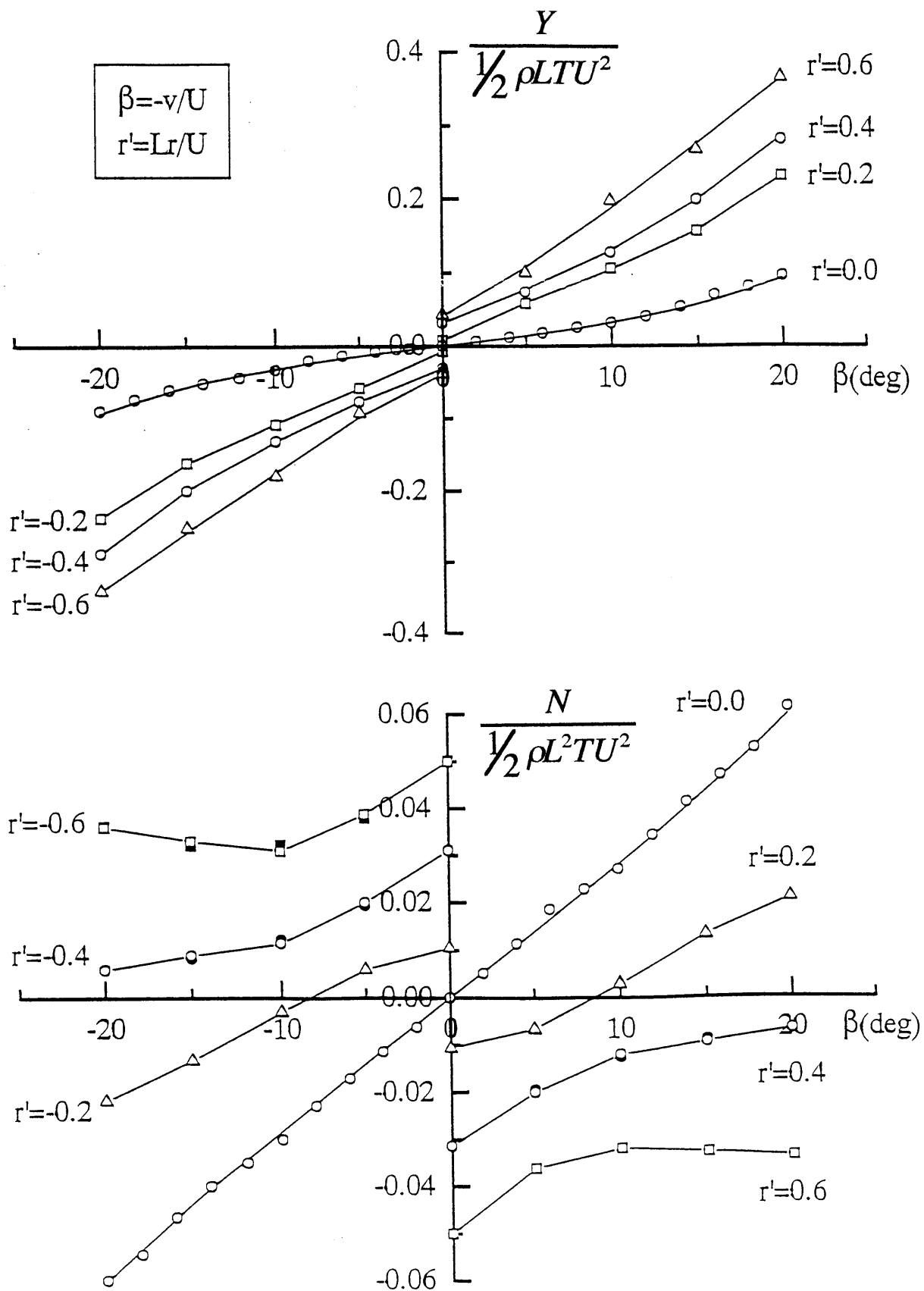
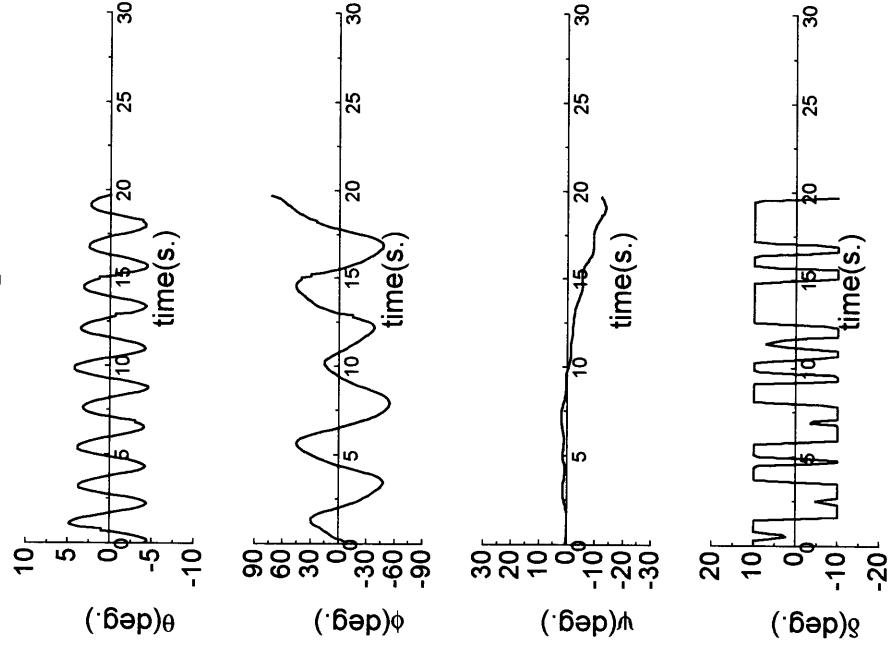
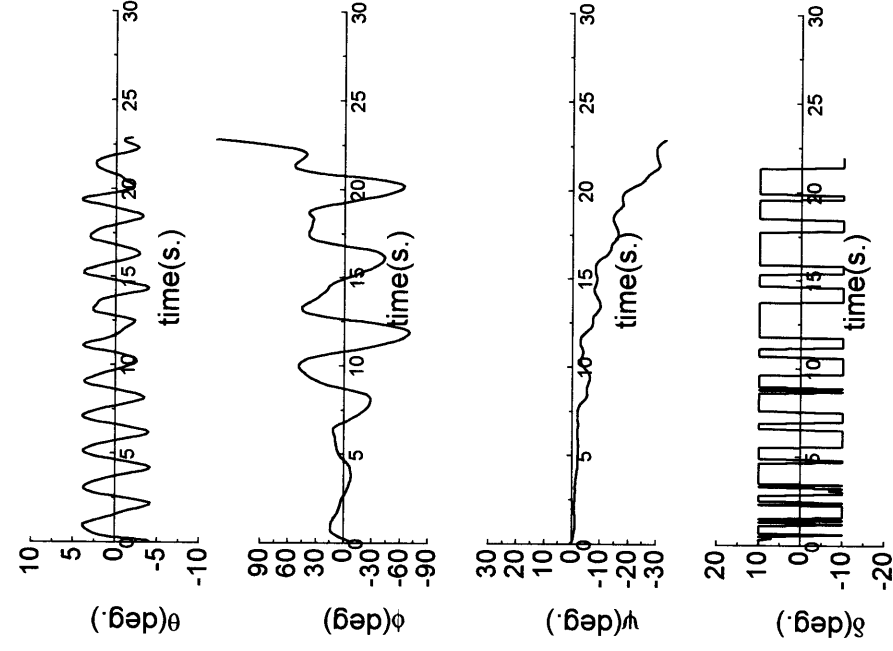


Fig. 11 Results of the circular motion tests of the ship A-1 at $Fn=0.242$ where L : ship length between perpendiculars and v : ship lateral velocity

Experiment



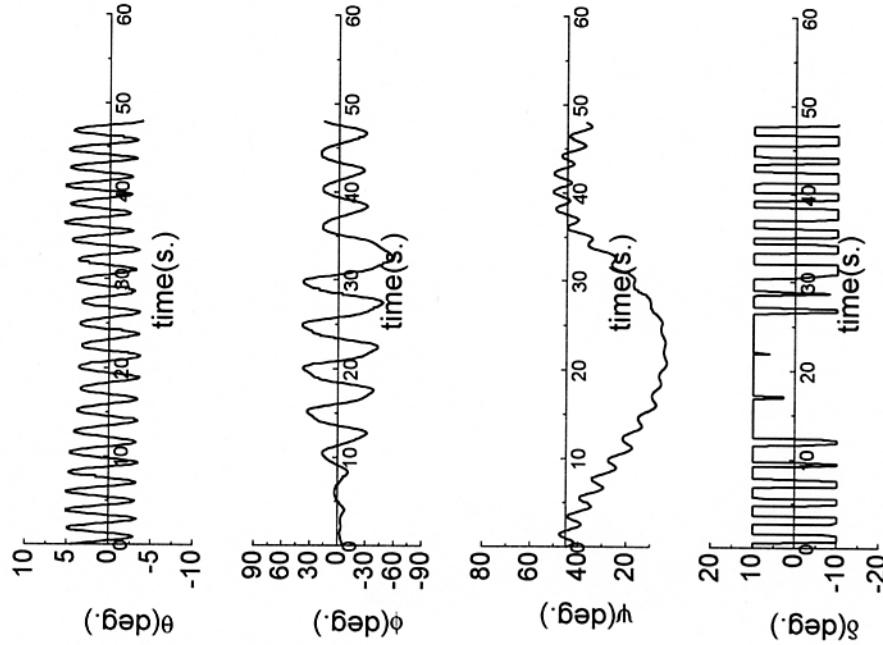
Simulation



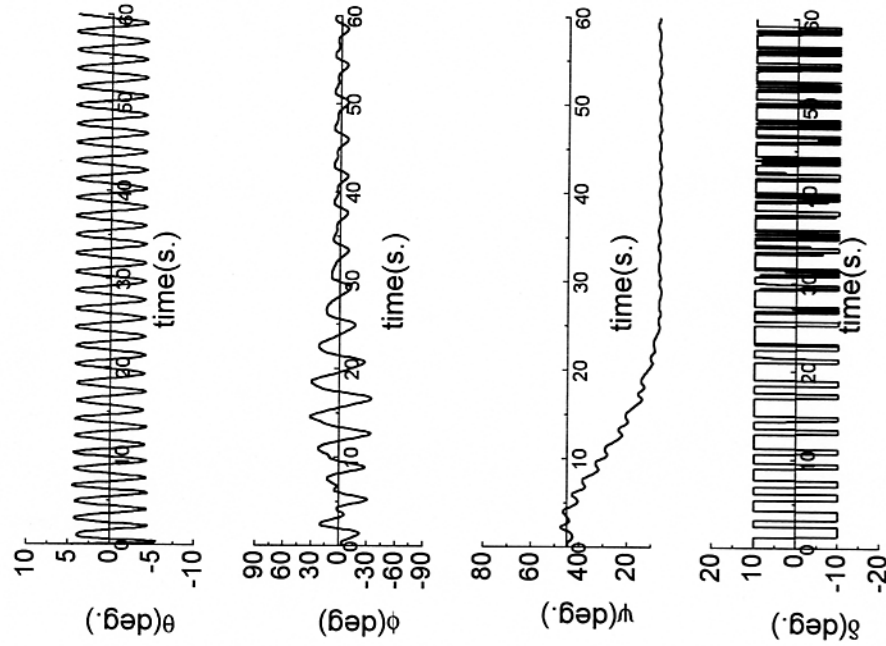
GM=0.15m, $\lambda/L=1.5$, $H/\lambda=1/25$, $Fn=0.2$ and $\chi=0^\circ$

Fig. 12 Comparison between the experiment and the numerical code of Osaka University (Munif, et al. 2000) for the ship A-1 in model scale

Experiment



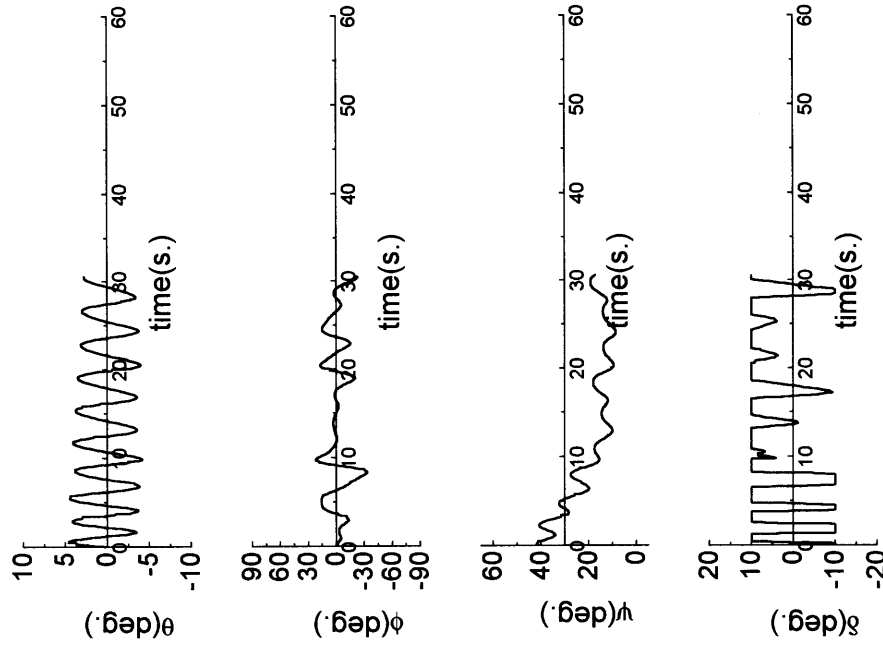
Simulation



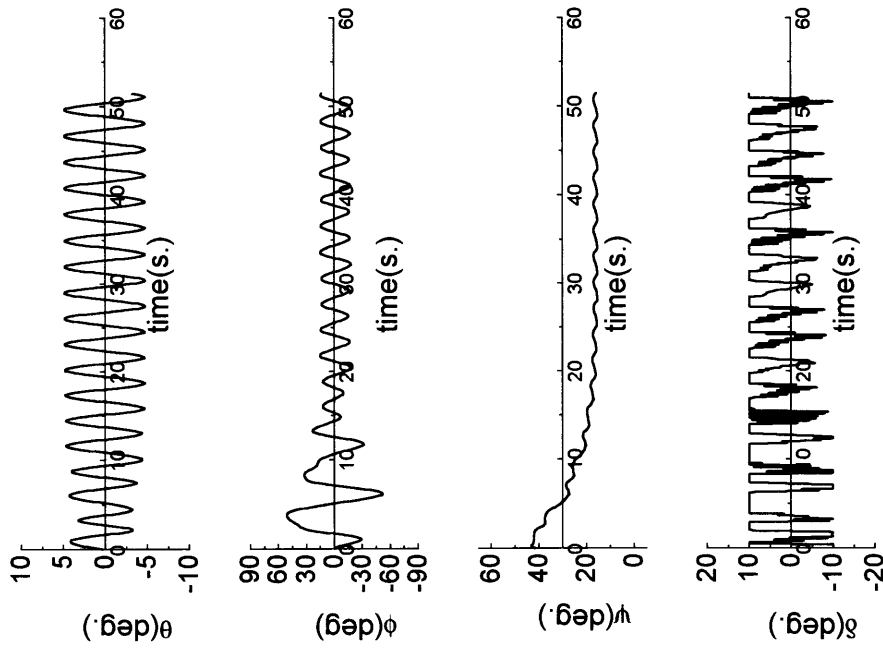
$GM=0.15m$, $\lambda/L=1.5$, $H/\lambda=1/25$, $Fn=0.2$ and $\chi=45^\circ$

Fig. 13 Comparison between the experiment and the numerical code of Osaka University (Munif, et al. 2000) for the ship A-1 in model scale

Experiment



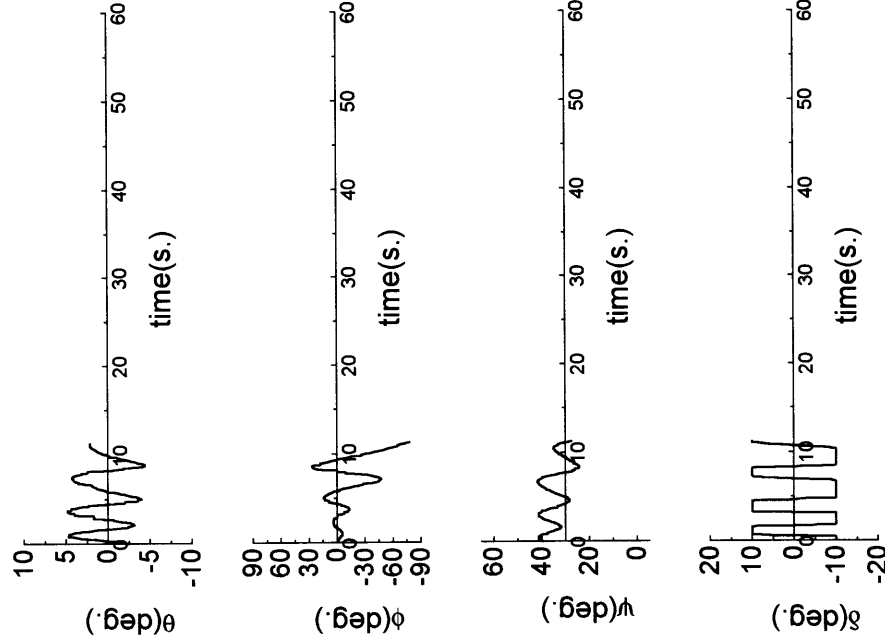
Simulation



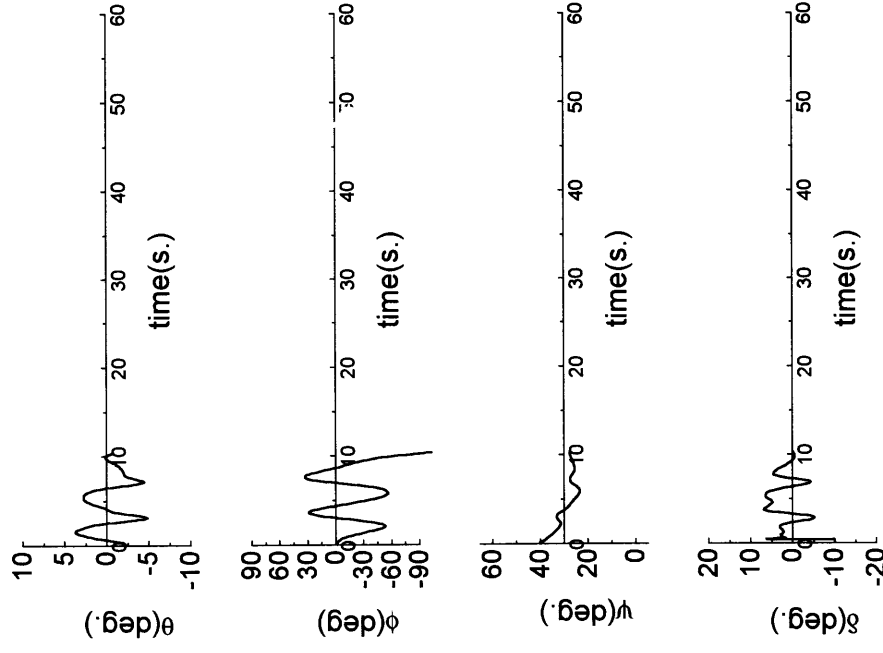
$GM=0.15m$, $\lambda/L=1.5$, $H/\lambda=1/25$, $Fr=0.3$ and $\chi=30^\circ$

Fig. 14 Comparison between the experiment and the numerical code of Osaka University (Munif, et al. 2000) for the ship A-1 in model scale

Experiment



Simulation



$GM=0.15m$, $\lambda/L=1.5$, $H/\lambda=1/25$, $Fn=0.4$ and $\chi=30^\circ$

Fig. 15 Comparison between the experiment and the numerical code of Osaka University (Munif, et al. 2000) for the ship A-1 in model scale

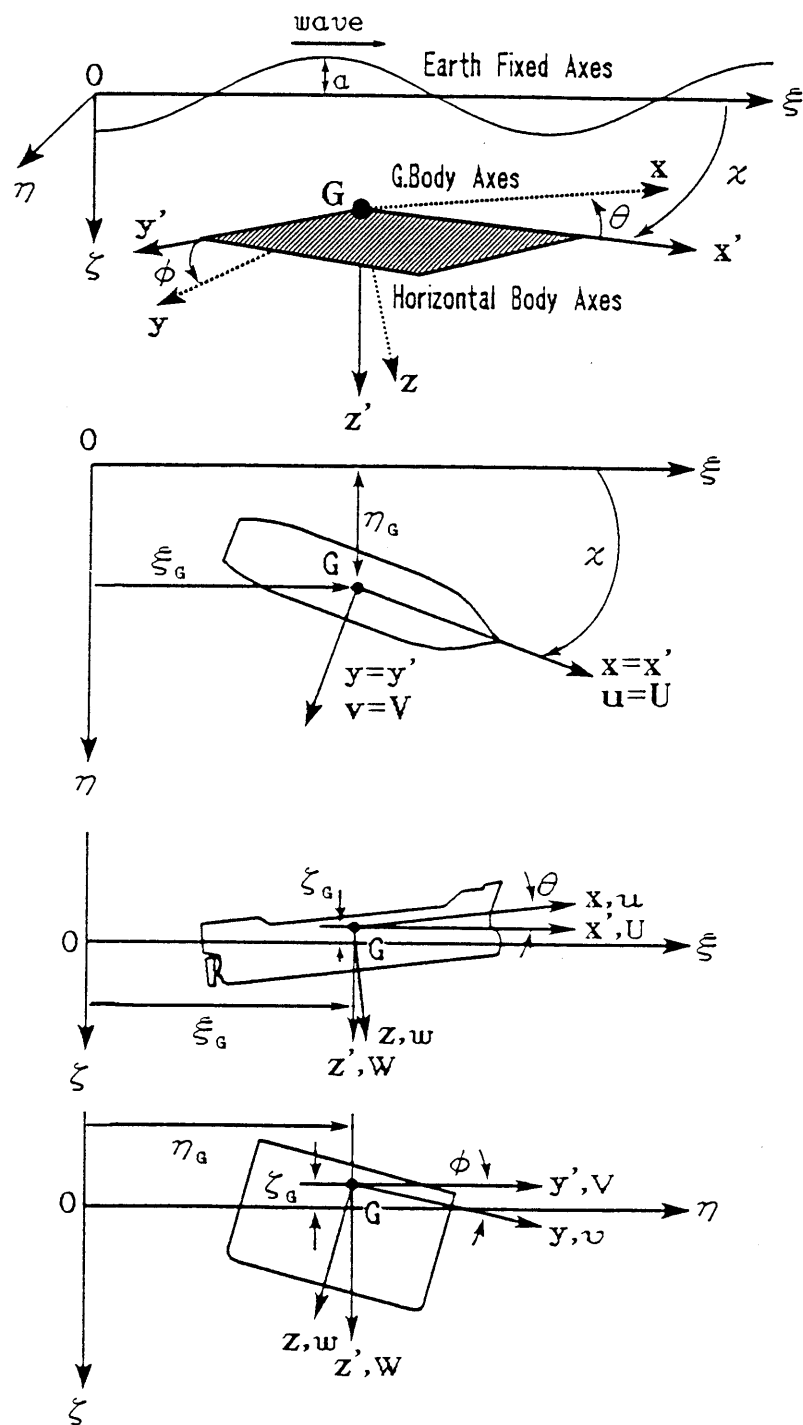


Fig. 16 Co-ordinate systems