

Chapter 8

Seakeeping Notation

Dynamics Review		Added Mass & Damping	
m	mass	DFT	Discrete Fourier Transform
b	damping coefficient	FFT	Fast Fourier Transform
c	stiffness coefficient	a	added mass
x	position	T	period (sec)
\dot{x}	velocity	f	frequency (Hz)
\ddot{x}	acceleration	D	draft
F_0	force amplitude	T_n	natural period (sec)
X	motion amplitude	Regular Waves	
ω	wave frequency (rad/s)	ζ_0	wave amplitude
ω_e	excitation (or encounter) frequency (rad/s)	c	wave celerity
ϕ	phase angle	u_g	group velocity
Λ	Tuning Factor, ω_e/ω_n	k	wave number
η	Damping Factor, $b/[2(m+a)\omega_n]$	α_0	wave slope
X/F_0	Magnification Factor	d	water depth
ω_n	natural frequency (rad/sec)	λ	wavelength
Dynamic Ballasting		DDG-51 in Head Seas	
I_5	pitch mass moment of inertia	ω_{*3}	heave natural frequency (rad/sec)
k_5	pitch gyradius	ω_{*5}	pitch natural frequency (rad/sec)
I_6	yaw mass moment of inertia	X_3/ζ_0	Heave Transfer Function
k_6	yaw gyradius	X_5/α_0	Pitch Transfer Function
R	model scale ratio	U	ship speed

Subscripts

1	Surge (linear)
2	Sway (linear)
3	Heave (linear)
4	Roll (rotational)
5	Pitch (rotational)
6	Yaw (rotational)
M	model
S	ship
e	excitation or encounter
n	natural (as in natural frequency)