- Useful formulae:
  - $\cos(a+b)=\cos(a)\cdot\cos(b)-\sin(a)\cdot\sin(b)$
  - $\sin(a+b)=\sin(a)\cdot\cos(b)+\cos(a)\cdot\sin(b)$

  - Surface elevation for regular wave with propagation direction μ
    $\zeta(x,y,t)=\zeta_a\cos\left(kx\cos(\mu)+ky\sin(\mu)-\omega t\right)$
  - Corresponding undisturbed wave potential for regular wave with propagation direction μ in deep water: $\phi_0=\dfrac{\zeta_a g}{\omega}e^{kz}\sin\left(kx\cos(\mu)+ky\sin(\mu)-\omega t\right)$
  - Pressure from Bernouilli equation:
  - $p=-\rho\dfrac{\partial\Phi}{\partial t}-\tfrac{1}{2}\rho(u^2+w^2)-\rho gz$
  - Forces/Moments from integrated pressures:
    $$\bar{F}=-\iint_S\left(p\cdot\bar{n}\right)dS$$
    $$\bar{M}=-\iint_S p\cdot\left(\bar{r}\times\bar{n}\right)dS$$

  - Undisturbed wave potential for regular wave with propagation direction μ in deep water: $\phi_0=\dfrac{\zeta_a g}{\omega}e^{kz}\sin\left(kx\cos(\mu)+ky\sin(\mu)-\omega t\right)$
  - Integrated Rayleigh distribution: $P(x>a)=e^{\frac{-a\char`^2}{2m_{ox}}}$
  - $e^{-ix}=\cos(x)-i\sin(x)$
  - Relation source strength, potential and Green's Function :
    $$\frac{\partial\phi_j}{\partial n}(x,y,z,\omega)=\frac{1}{4\pi}\iint_{S_0}\sigma_j(\hat{x},\hat{y},\hat{z},\omega)\cdot\frac{\partial G}{\partial n}(x,y,z,\hat{x},\hat{y},\hat{z},\omega)dS_0$$
  - Internal shear vertical shear force:
    $$Q(x_1)=\int_{stern}^{x_1}-F'_{w3}(x_b)-X'_{h3}(x_b)+m'\cdot\left(\ddot{z}+\ddot{\varphi}\cdot y_m'-\ddot{\theta}\cdot x_b\right)dx_b$$
    $$=\int_{stern}^{x_1}-q_z(x_b)+m'\cdot\left(\ddot{z}+\ddot{\varphi}\cdot y_m'-\ddot{\theta}\cdot x_b\right)dx_b$$
  - Internal bending moment:
    $$M(x_1)=x_1\cdot Q(x_1)+\int_{stern}^{x_1}x_b\cdot\left(q_z-m'\cdot\left(\ddot{z}+\ddot{\varphi}\cdot y_m'-\ddot{\theta}\cdot x_b\right)\right)dx_b$$
    NB: make sure you know how to determine the distributed load q_z!

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