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Ā 5 \$f! ' ° \$!&\$%! it_ ' ° ") f!~° ! &f! \$_ % 'f) ° ž! fi° ž! " f! žf! f!& it_ ' ° ! ') ° , & , ! ž! it_ ' ° ") f!~'! ° &f!_ "' f!i f!f!fV/f!\$ ° /ž! " f!~_ ' ° \$!&\$%! it_ ' ° ! ') ° " f!f! " f!&!

Ā Of!f! ~ , f!\$! & '° ž! " f!~ ") f!~° '! '\$% f! f!_ ' % it_ ' ° / ž! " f!~! \$! it_ ' °) f!~ h*° ! //f!\$! f) ° +* i f!f!"" f! ' / ž.

Ā \$f! ' ° \$!&\$%! it_ ' ° ") f!~° ! \$\$_ % i % & i f!f!ž! " f!# " f!& žf) % &f!~°) &"! ž_ & ") V*! ž! f!f!"" f! ' / ž.

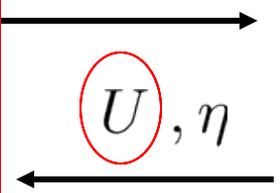
Ā 3! " f!6_) f!

F^w

Ā 6 f! ' / ž ° 6_) f!

$$\mathcal{N}_T + \nabla_{\mathbf{h}} \cdot ([\mathbf{C}_{gr} + \mathbf{U}]\mathcal{N}) = -D + G + NL$$

$$\mathcal{N} = \frac{E}{\sigma}$$



$$\frac{DU^c}{Dt} + \frac{1}{\rho} \nabla \mathbf{p}^c = -\mathbf{F}^w$$

> '2'14 * ' .

$$\mathcal{N}_T + \nabla_{\mathbf{h}} \cdot ([\mathbf{C}_{gr} + \mathbf{U}] \mathcal{N}) = -D + G + NL$$

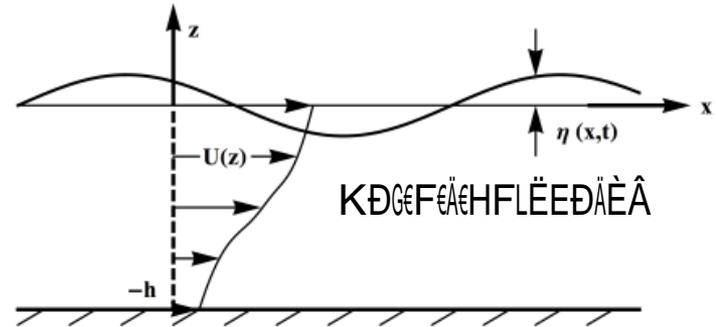
$$\mathcal{N} = \frac{E}{\sigma} \quad \text{J}$$

~ '6!t' 7%f!r!t' .

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Q@* '* fi* 2'0 i=ABCD



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E 3 : ; <' fi fi) (°

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> ' 2° | Q '* fili+* fifi' "2' , '* fi

$$\mathcal{N}_T + \nabla_{\mathbf{h}} \cdot (\mathcal{F}) = 0$$

$$\mathcal{N} = - \int_{-h}^{\eta^c} \frac{1}{\sigma^2 k^2} \frac{\partial^2 \sigma}{\partial z^2} w^2 dz + \left(\frac{2g}{\sigma^3} + \frac{1}{\sigma^2 k^2} \frac{\partial \sigma}{\partial z} \right) w^2 \Big|_{z=\eta^c}$$

$$\begin{aligned} \mathcal{F} = & \int_{-h}^{\eta^c} \left(-\frac{\mathbf{U}(z)}{\sigma^2 k^2} \frac{\partial^2 \sigma}{\partial z^2} + \frac{1}{\sigma k^2} \frac{\partial^2 \mathbf{U}(z)}{\partial z^2} - \frac{2\mathbf{k}}{k^2} \right) w^2 dz \\ & + [\mathbf{U}(z) \left(\frac{2g}{\sigma^3} + \frac{1}{\sigma^2 k^2} \frac{\partial \sigma}{\partial z} \right) - \frac{1}{\sigma k^2} \frac{\partial \mathbf{U}(z)}{\partial z} + \frac{2g\mathbf{k}}{\sigma^2 k^2}] w^2 \Big|_{z=\eta^c} \end{aligned}$$

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Æ 1, " + t' t' ž i ž , & fi t' % i fifi & fi t' \$ ' ! , , & ! \$ fi fi ° E @ * " * fi * 2' O 8 = ABC fi ! " # \$! 9 | + ° fi 8 = AGAH (ž fi) fi' fi , ! ° 3 ! " fi \$ t' / & % ! t' ! ') fi ! " t' fi , &) t' t' ° / ž ! " fi! \$ t') fi' t' * ! ') / % t' \$, ! & ' i & fi % i ~ / & " i fifi / % i fifi & .

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 E 4 f i z ° " f i & t , ° / A f i & % & ! i t , ° ~ , ' % t , ° ~ , / ! " # \$ i 9 i + ~ ° f i i = A G A 8

$$|\mathbf{U}|/c = O(1) \quad w = w^{(0)} + (\epsilon)w^{(1)} + O(\epsilon^2)w^{(2)} + O(\epsilon^3)$$

$$|\partial\mathbf{U}/\partial z|/\omega = \epsilon \quad c = c^{(0)} + (\epsilon)c^{(1)} + O(\epsilon^2)c^{(2)} + O(\epsilon^3)$$

$$w(z) = -i\sigma_s a \frac{f_0(z) + f_1(z)}{f_0(0)}$$

$$(c_0 - \hat{\mathbf{k}} \cdot \tilde{\mathbf{U}})^2 = \frac{g}{k} \tanh kh = \left(\frac{\sigma}{k}\right)^2 \quad \tilde{\mathbf{U}} = \frac{2k}{\sinh 2kh} \left[\int_{-h}^0 \mathbf{U}(z) \cosh 2k(h+z) dz \right]$$

$$c_1 = 0$$

$$f_0(z) = \sinh k(h+z)$$

$$f_1(z) = \frac{1}{2k(c_0 - \hat{\mathbf{k}} \cdot \tilde{\mathbf{U}})} \left[\tilde{I}_1(0) - \tilde{I}_1(z) - \frac{\tilde{I}_2(0)}{\tanh kh} \right] \sinh k(h+z) \\ + \frac{1}{2k(c_0 - \hat{\mathbf{k}} \cdot \tilde{\mathbf{U}})} \tilde{I}_2(z) \cosh k(h+z)$$

$$I_1(z) = \int_{-h}^z \hat{\mathbf{k}} \cdot \mathbf{U}''(\xi) \sinh 2k(h+\xi) d\xi$$

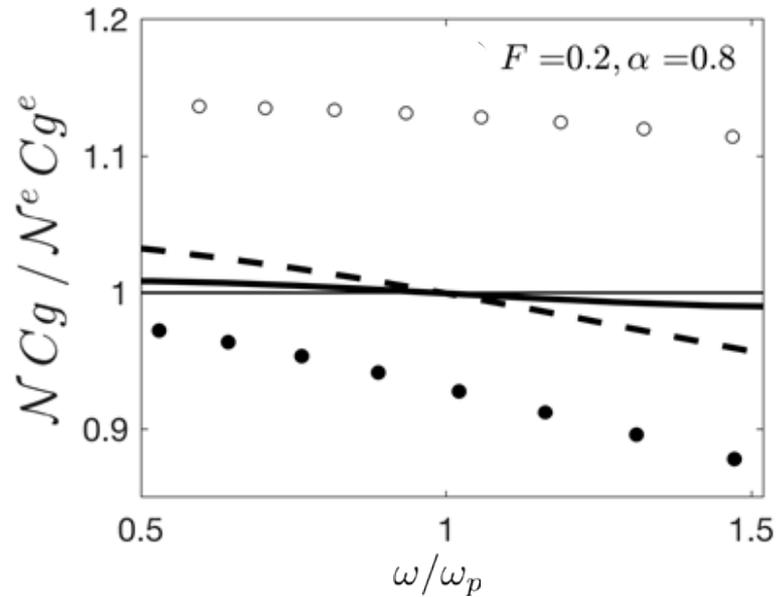
$$I_2(z) = \int_{-h}^z \hat{\mathbf{k}} \cdot \mathbf{U}''(\xi) \cosh 2k(h+\xi) d\xi$$

К"fi° · ". \$ifir ° · "" ° , 105""° fi, 18 Q °* fi||%5| 10* Ł - · " ff* fi||

$$\mathcal{N}^{exc} = N_0 \left(1 - \frac{C_{rs}\Omega}{2g} \right)$$

$$N_0 = \frac{E_0}{\sigma_s}$$

$$C_{ga}^{exc} = U_s + \frac{g(1+G) - C_{rs}\Omega G}{2g - C_{rs}\Omega} C_{rs}$$

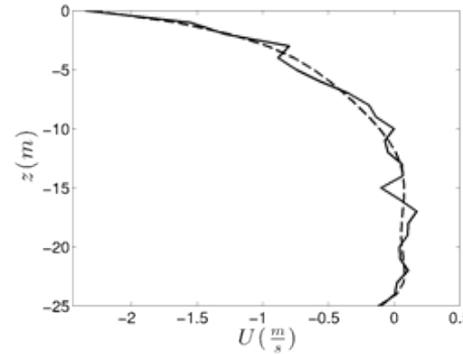
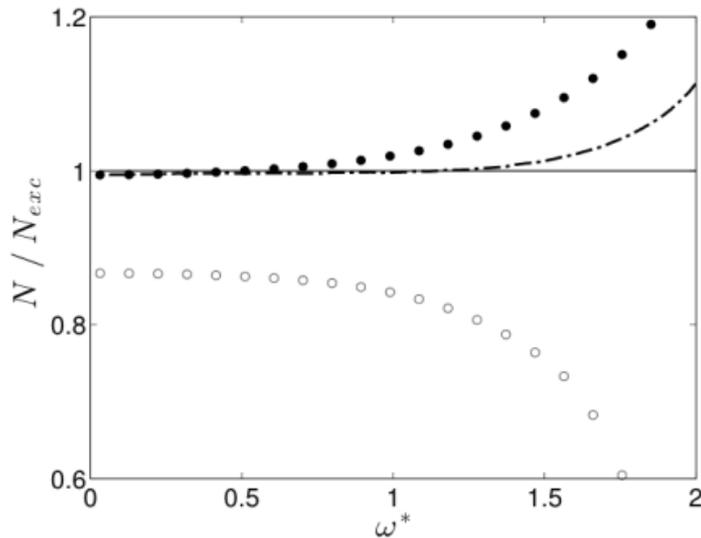


$$F = \frac{U}{\sqrt{gh}}$$

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Æ MÇ İ ĐĐ€ÉÈİLĚHİÇÄ€HFĚL İ ÉNLÇĐL
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 HGLŃOCEÓLŌŃ€ÖĐDŁOFGİÇĐFĚĐĚLHFL
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Æ , , & k" ! ifl flk, &f ~t_ ° ~° /_ & ififl ž! " fl! \$t_ ° °) fl' ~h*° ! °) °! \$t_ ° ° /%k° t° ° ifl& ° ° /° ! ° ž fl Žfiifl) ° t' if Ž& ° ° " fl&) fl, ifi ° /° ififl! &+h& &*° \$%&&f! i ° , & /° fl' ž fl&f! °) fl' fl_ ° , fl) .

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M5° f| " * f|f|

