Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Revisit of Cauchy-Poisson Problem in unsteady water wave problem

Author(s): H.M. Baek, Y. J. Kim, I. J. Lee, S. H. Kwon

Question(s) / Comment(s):

Very elegant work. You answer a problem, from theoretical and experimental viewpoints, that how to propose initial value conditions for unsteady free-surface waves. We should impose initial values on the surface elevation and the potential, instead of, those with $\phi|_{t=0}, \partial\phi/\partial t|_{t=0}$.

Asked by: Dongqiang Lu

Answer(s):

Thank you for your encouraging comment.

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Title of paper: Revisit of Cauchy-Poisson Problem in unsteady water wave problem

Author(s): H.M. Baek, Y. J. Kim, I. J. Lee, S. H. Kwon

Question(s) / Comment(s):

Thanks for a very nice presentation and elegant analysis. My question is: In numerical solvers and their validation, standing wavers are often used. Known nonlinear solutions are reproduced – often with a wave probe as initial condition and a zero velocity field. Can you comment on the connection between the ware presented here and next works?

Asked by: Henrik Bredmose

Answer(s):

I guess the ideas are the name.

My approach adopted a very small scale but accurate initial condition.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Experimental observation of four-wave resonant interaction: from low steepness to wave breaking

Author(s): **F. Bonnefoy, F. Haudin, G. Michel, B. Semin, T. Humbert, S. Aumaitre, M. Berhanu, and E. Falcon**

Question(s) / Comment(s):

In your experiments, have you observed any effect of viscosity (in the fluid, not from the walls/bottom) on the instability causing the four-wave interaction, as suggested by H. Segur et al. JFM 2005?

Asked by: **John Grue**

Answer(s):

In our experimental setup, the distances are about 10 to 20 times wavelength, and thus viscous effects are negligible.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Time domain hybrid TEBEM for 3D hydrodynamics of ship with large flare at forward speed

Author(s): J.K. Chen, W.Y. Duan, B.B. Zhao and Q.W. Ma

Question(s) / Comment(s):

Thanks for your interesting presentation.

Can you comment on the influence of the discretization from the inner domain when calculating impulse response function? A low-pass filtering effect is supposed to be observed, with possible instabilities of high frequencies, due to the space discretization of the inner domain. Is special case needed to cope with these effects in your simulations?

Asked by: Pierre Ferrant

Answer(s):

For the slow forward speed, the unstability problem won't occur for simulation of impulse response function by the hybrid TEBEM method. When the forward speed increase, for example, the $\tau = \frac{u\omega_e}{g} > 0.25$, the condition that there are none disturbed wave condition is applied. So the unstability problem can also be solved.

Now, I find some parameters which will influent the stability of time-domain simulation. First, the breath of inner domain, now I set the values as $B/L = \sqrt{3}/2$, second, $\Delta x/\Delta y = 1.5-2.0$, Δx =mesh size in x direction, Δy =mesh size in y direction.

The 32nd International Workshop on
Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Water depth effect on fully nonlinear focused waves

Author(s): Xianglong Chen, Wei Bai, Paul Taylor, Ser Tong Quek, Ling Qian, Jianguo Zhou, Zhihua Ma

Question(s) / Comment(s):

At intermediate water depth with kh~1, a) the focusing effect is strongly reduced as compared to deep water, and b) wave breaking strongly limits the wave height, where the waves are much less no-linear as compared to the deep water case. Do you observe the effects a) and b) in your experiments?

Ref. J. Gure, J. Kotaas, A. Jensen (2014) Velocity fields in breaking –limited waves on finite depth. Eur. J. mech. B/Fluids 47-97-107.

Asked by: John Grue

Answer(s):

Yes. Actually that is the reason why we fix the wave steepness for the cases in different wave depths. We would like to run the focused wave with larger wave crests. But the wave will break in shallower water if we fix the wave amplitude for all water depths. Thus, it makes sense that the wave focusing is weaker compared to the deep water. By the way, as our HOBEM is not able to simulate the water breaking problem, we need to limit the wave heights for both numerical and experimental cases.

In the present study, we are not focusing on the influence of wave breaking. At the present fixed wave steepness, where the wave is not breaking, our current finding is that the nonlinearity is stronger in shallower water. We will further investigate and check our conclusion to ensure it is reasonable. Many thanks for the reference.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Higher-order asymptotic expansions of Fourier integral with two nearly coincident saddle points

Author(s): Yuzhi Dai & Xiaobo Chen

Question(s) / Comment(s):

In classic work, people usually performed the Taylor expansion on the phase function. In your paper, you expand both the amplitude and phase functions. In the second place, the expansion orders for amplitude and phase functions are different?

Asked by: Dongqiang Lu

Answer(s):

I refer to this book to determine the expansion rule.

Bender, C. M. and Orszag, S. A. 1978 Advanced Mathematical Methods for Scientists and Engineers. pp. 272-273, New York: McGraw-Hill.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Wave forces on porous geometries with linear and quadratic pressure-velocity relations

Author(s): Jørgen S. Dokken, John Grue and Lars P. Karstensen

Question(s) / Comment(s):

In the linear law, how do you relate your b coefficient? How b is related to the porosity τ or to the wave steepness?

Asked by: Bernard Molin

Answer(s):

We have used an experimental fit between the coefficient b, the open area ratio τ and a small wave steepness κA obtained by Fenfang Zhao, Weiguang Bao, Takeshi Kinoshita and Hiroshi Itakura(2011). Theoretical and experimental study on a porous cylinder floating in waves. J. Offshore Mech. Arct. Eng. 133(1), 011301(1-10)

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International Workshop on Water Waves and Floating Bodies

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

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Title of paper: Wave forces on porous geometries with linear and quadratic pressure-velocity relations

Author(s): Jørgen S. Dokken, John Grue and Lars P. Karstensen

Question(s) / Comment(s):

Are the solid boundaries included naturally by setting the porosity to zero in those elements?

Asked by: Harry Bradford Bingham

Answer(s):

Yes.

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Discussion Sheet

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Title of paper: Wave forces on porous geometries with linear and quadratic pressure-velocity relations

Author(s): Jørgen S. Dokken, John Grue and Lars P. Karstensen

Question(s) / Comment(s):

We have used the clanical pressure-velocity relationship to introduce dissipation effect in the fluid*. Unlike our formulation including BEM on solid boundary and on dissipative surface ("porous" surface), your formulation considers only porous surface. Do you think your BEM can include the boundary surface (part of whole surface) with smaller porosity which reach to zero (solid)?

*Chen et al. IWWWFB2011

Asked by: Xiaobo Chen

Answer(s):

The flow-through velocity, W_n , with the linear law is : $W_n = (b/\mu)\Delta p \to 0$, for $b \to 0$ with quadratic law, with an open area ratio τ , $W_n{}^2 \sim \tau^2 \Delta p$ when $\tau \to 0$, Δp finite, which means that $|W_n| \sim |\tau|$ when $\tau \to 0$. The coefficient α_D in eg.(12), in the quadratic case becomes $\alpha_D \sim \tau^2/|w_{D,j}| \sim \tau$ when $\tau \to 0$. This is similar to radiation problem. Egs.(11) reduce to the decoupled integral egs, for the external and inner problems, for $\alpha_D = 0$. α_N should be inside the integration in (11) (a field point in the paper).

Discussion Sheet

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April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Wave forces on porous geometries with linear and quadratic pressure-velocity relations

Author(s): Jørgen S. Dokken, John Grue and Lars P. Karstensen

Question(s) / Comment(s):

1. You are introducing the general seakeeping problem for porous geometries, which in principle includes both the diffraction and the radiation hydrodynamic problems. However you are presenting the results for the diffraction case only. How are you planning to consider the radiation problem and consequently the full seakeeping problem? Which motion amplitude will you chose for the evaluation of the added masses in the radiation problem? Due to the nonlinearities at the body boundary, the solution of the radiation problem will depend on the body motions? In the case of seakeeping, in addition to the iteration at the body boundary, you will have to iterate on the body motions too? How do you evaluate the restoring forces? Could you please comment?

2. In many cases the fishnets are flexible and this flexibility should be taken into account. Is it possible to do this within this approach? If you are planning to use the modal approach for that, how you will evaluate the modal basis (dry modes …)?

3. What happens when the porosity goes to zero? Does your model still apply?

Asked by: Sime Malenica

Answer(s):

1. First of all, thank you for your questions and comments, they are very helpful. The theory including the complete diffraction-radiation problem has been developed completely. The flow through velocity at the porous geometry has to be obtained iteratively, where the full diffraction-radiation problem, including obtaining of the body responses, have to be calculated at each iteration step. Since the added mass and damping coefficients depend on the KC-number, all coefficients have to be calculated at each iteration.

In this paper we have only illustrated the diffraction problem where the geometry is fixed. A floating geometry is in principle not difficult to model, however, we need to introduce floating parts of the geometry which balance the weight. This is work in progress.

2. Yes, the flexibility of the porous geometry should be taken into account. A modal theory, including dry or wet modes, is under development and is straight forward to incorporate in the formulation.

3. When the porosity goes to zero, the geometry becomes solid.

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Discussion Sheet

The 32nd International Workshop on
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April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Extension of Haskind's relations to cylinder wave fields in the context of an interaction theory**

Author(s): **F. Fábregas Flaviá and A. H. Clèment**

Question(s) / Comment(s):

1.This paper uses a multipole expansion matrix which is a low in convergence especially when the number of bodies is large, did you notice a similar tendency in your computations?

2. The same idea can be applied to the wave drift force on a particular body interacting with other bodies. I hope you can confirm this analysis as well.

Asked by: **Masashi Kashiwagi**

Answer(s):

1.Yes, we observed slow convergence for the array composed of 4 truncated vertical cylinders. Indeed, the number of angular modes required to represent the wave field at the cylinder is approximately ~3. However, when using multipole expansion matrix, the total number of angular modes required increased to ~13.

2. Further work on the application of this idea to wave drift force will be pursued by the authors.

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International Workshop on Water Waves and Floating Bodies

Discussion Sheet

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April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Extension of Haskind's relations to cylindrical wave fields in the context of an interaction theory**

Author(s): **F. Fábregas Flaviá and A. H. Clèment**

Question(s) / Comment(s):

1. Are you including the evanescent modes also in the array computations?

2. It seems the theory is valid for arbitrary geometrical structures confined within a cylindrical fluid column. Have you compared the results for other geometrical than truncated cylinders with eg., BEM software?

Asked by: **Malin Göteman**

Answer(s):

1. Yes, we included evanescent modes in the array calculations. The hydrodynamic operators of the isolated body required by the direct model interaction theory by Kageuoto &Yue (1986) were computed using the methodology by Goo & Yoslide (1990) which, as opposed to other strategies such as the one proposed by McNatl (2015), enables one to take into account evanescent models.

2. Yes, for both a cube and a hemisphere and very good agreement with standard BEM computation was observed.

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Title of paper: Extension of Haskind's relations to cylindrical wave fields in the context of an interaction theory

Author(s): F. Fábregas Flaviá and A. H. Clèment

Question(s) / Comment(s):

1. Can you extend this method to find other identities?

Asked by: Malin Göteman

Answer(s):

Yes, additional identities can be derived that relate, for instance, the Radiation Characteristicsand the radiation damping coefficients both for a single isolated body and for an array.

These identitieshave been published by the anchors in the Applied Ocean Research journal under the title: "Extension of Haskind's relations to cylindrical wave fields in the context of an interaction theory." (2017).

IWWWFB — Discussion Sheet

International Workshop on Water Waves and Floating Bodies

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Wave-body interaction with overlapping structure grids in the HPC method

Author(s): Finn-Christian W. Hanssen, Marilena Greco, Odd M. Faltinsen

Question(s) / Comment(s):

1. Why combine two methods HPC and IBM? Can we use IBM singly to solve the problem?
2. What do you mean by the limit of traditional potential theory for in the potential theory we are able to treat overturning and breaking of waves?

Asked by: Zhi Zong

Answer(s):

1. The HPC method is the numerical method used to solve the Laplace equation. The IBM is the method used within the solver to account for boundary conditions on the free surface and moving bodies.
2. In the presentation, traditional potential theory is used as a reference to typical applications at potential flow involving wave body interaction with floating structures in offshore engineering. In this context, the modelling of overturning waves is less typical. Still, it is fully acknowledged that overturning waves can be modelled by potential flow theory until the point of impact with the underlying surface.

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International Workshop on Water Waves and Floating Bodies

Discussion Sheet

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Title of paper: Wave-body interaction with overlapping structure grids in the HPC method

Author(s): Finn-Christian W. Hanssen, Marilena Greco, Odd M. Faltinsen

Question(s) / Comment(s):

Very nice work on HPC method!

For the background grids, the cell could be in the form of a square ($\Delta x = \Delta y$), so, what order of accuracy could it be achieved if the symmetrical features are used?

Asked by: Hui Liang

Answer(s):

It is found that a completely square cell can achieve eight order accuracy for the potential, and fourth order accuracy for spatial derivatives of the potential. Since real problems usually involve Neumann boundaries, it is often found that the global error has a convergence rate somewhere between fourth and eight order. The global error is also influenced in the case we operate with multiple grid sizes.

Title of paper: Wave-body interaction with overlapping structured grids in the HPC method

Author(s): Finn-Christian W. Hanssen, Marilena Greco, Odd M. Faltinsen

Question(s) / Comment(s):

Very impressive work, congratulations. Are you solving the system of equation directly on iteratively and if iteratively what method and what sort of iteration count to your achieve?

Asked by: Harry Bradford Bingham

Answer(s):

We are using iterative solvers to solve the global sparse matrix system. For the present simulations we have used the BiCGStab solver that is included in the Python Scipy Sparse library, which is found to be slightly faster than the GMRES solver.

For preconditioner we apply the SPLU or SPILU matrix factorizations that are also built into the Scipy sparse library.

Because the topology and size of the matrix system can change from one time step to another, it is necessary to obtain a new preconditioner before each matrix solution.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Parameter optimization in wave energy design by a Genetic Algorithm**

Author(s): **Marianna Giassi, Malin Göteman**

Question(s) / Comment(s):

1. How were the parameters of the genetic algorithm chosen? Were the results sensitive to the choice of the parameters?

2. Did you conduct sensitivity studied on the vacation of the (x, y) optimum position of the WECS?

3. Did you use the distance act-off method for the calculation of the hydrodynamic interactions? How accurate would it be for the estimation of the interaction factors?

Asked by: **Francesc Fabregas Flavià**

Answer(s):

1. The parameters were chosen by trial and enrol and were not sensitive to the results.

2. We have studied this in previous studies but not in the one presented here.

3. No, full hydrodynamic interaction. The q-factor might be effected slightly but for large park the computation of line is too heavy that it might be a useful feature.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Parameter optimization in wave energy design by a Genetic Algorithm

Author(s): Marianna Giassi, Malin Göteman

Question(s) / Comment(s):

Thank you for the nice and clear presentation.

Can you comment on the wave climate considered for the optimization study? And whether it is possible to include the wave condition in the optimization model by adding to the number of variable?

Asked by: Masoud Hayatdavoodi

Answer(s):

The wave climate used is irregular wave line series measured offshore in the west coast of Sweden, statist iced $H_s = 1.53m$ and $T_p = 5.01\text{s}$

To optimize the logout of a specific size all the incoming sea state should be included, but that would probably be in a statistical anonyms and not directly included in the GAalgorithm.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Hydroelastic response of a submerged plate to long waves

Author(s): Masoud Hayatdavoodi and R. Cengiz Ertekin

Question(s) / Comment(s):

You stated that energy in extenuated by the motion of the flat plate and the flexible plate, since no extend damping in applied in these cases, it would expect your solution to be converse energy.

Asked by: Harry Bingham

Answer(s):

Thank you for your clarifying question and comment.
The question is concerned with two problems:
(i) a vertically oscillating, submerged, rigid plate. In this case, the plate is connected to a damper and spring system, and the motion results in friction with the guide rails, which is included in the equations. In this system, part of the energy is extracted by the damper and also due to the friction. Details of this system is discussed in last year's workshop (IWWWFB 2016, Michigan, USA) abstract.
(ii) the second problem is the hydroelastic response of a deformable plate, discussed here. In the preliminary model, only the wave-induced loads on the plate are considered, i.e., there is no damping or friction. Hence energy is conserved in the system. Any change in the energy level, again in the absence of damping and friction, would be due to the numerical errors. We, however, monitor mass, momentum and energy (in general), and would modify the numerical solution if the fluctuations are significant. This is an ongoing work.

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International Workshop on Water Waves and Floating Bodies

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Hydroelastic response of a submerged plate to long waves**

Author(s): **Masoud Hayatdavoodi and R. Cengiz Ertekin**

Question(s) / Comment(s):

How does your model treat the singularity on the leading and trailing edges?

Asked by: **Xinshu Zhang**

Answer(s):

In this approach, we separate the domain into four regions, namely up wave (R I), above the plate (R II), below the plate (RIII), and down wave (R Ⅳ). The GN equation, subject to appropriate boundary conditions, are solved in each region. At the leading and trailing edges, where different regions meet, there are two discontinuity curves, i.e., there are no singularities in this approach. To obtain a continuous solution throughout the domain, we use jump and matching conditions at the discontinuity curves, demanded by the theory and by the physics of the problem, respectively. Details of the jump and matching conditions are discussed in the abstract, with citation to the appropriate references for more information.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

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Title of paper: Hydroelastic response of a submerged plate to long waves

Author(s): Masoud Hayatdavoodi and R. Cengiz Ertekin

Question(s) / Comment(s):

The presentation is very clear and organized. The research topic is interesting and quite important to future improve the performance of the wave carpet energy device. I want to ask:

1. whether does the wave elevation decay after it passes the submerged device? If so, where does the energy loss go?

2. Did you consider to add the external damper and spring in your model in the future?

Asked by: Yichen Jiang

Answer(s):

Thank you for the positive feedback and for your question.

In the preliminary model discussed here, the deformation of the plate is only due to the wave-induced pressure differential. That is, we do not consider the effect of spring and damping in this initial study. Of course, these will be added to the equation of motion of the plate once the model is fully developed. The addition of the spring and damping effect, does not alter the solution procedure. In the absence of damping and friction, energy is considered in the system, assuming the numerical computations are error-free. The change in the wave height down wave, in this case, is due to the wave-structure interaction, which results in energy-scattering, formation of nonlinear oscillations, and wave reflection. In the case of the wave-induced oscillation of a horizontal, rigid plate, which was briefly discussed during the presentation, both the damping and spring effects are included, as well as the friction between the plate and the guide rails. A portion of the energy is then decayed due the damping effect and the friction. Hence, the wave height down wave of the plate is dropped both due to the energy decay and due to the wave-structure effects.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Hydroelastic response of a submerged plate to long waves

Author(s): Masoud Hayatdavoodi and R. Cengiz Ertekin

Question(s) / Comment(s):

Could you comment on the validity of the linear assumption on the vertical velocity of the level FGW Equations?

Asked by: Paul F. White

Answer(s):

The linear assumption is limited to shallow water waves. The assumption of higher order polynomial representation of vertical velocity is currently being utilized by other researchers for deeper water depths.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Design of small water channel network for shallow water cloaking

Author(s): Takahito Iida and Masashi Kashiwagi

Question(s) / Comment(s):

This is a hot topic, and this is very interesting presentation.

We consider economic problem. In your presented example, the outer radius is 21.7m, water depth is 5m, then the outer radius will be 100m. Is it economically feasible?

Asked by: Zhi Zong

Answer(s):

Thank you for your comment.

In current study, we have not considered real application. We should carefully decide initial condition (radii of inner and outer domain) because parameters of channel (widths, depth) are too sensible. Sometimes they become minus or bigger than size of micro section. In the future, we redesign channels to be more feasible, it depends on the application which we want to hide from waves.

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Title of paper: Design of small water channel network for shallow water cloaking

Author(s): Takahito Iida and Masashi Kashiwagi

Question(s) / Comment(s):

It's a very interesting topic. In the paper the cloaking of a circular cylinder is considered. How about the other structure with different geometry, for example a square cylinder? Is it easy to implement?

Asked by: Ying Gou

Answer(s):

Thank you for your comment.

It is possible to change geometry of cloaking object(s). for example, we can hide arbitrary shape of structure in circular cloaking domain as bellow fig 1. (It is presented last year's IWWWFB). Or we can consider arbitrary transformation as fig 2. Of course square cylinder is able to cloaking as fig 3.

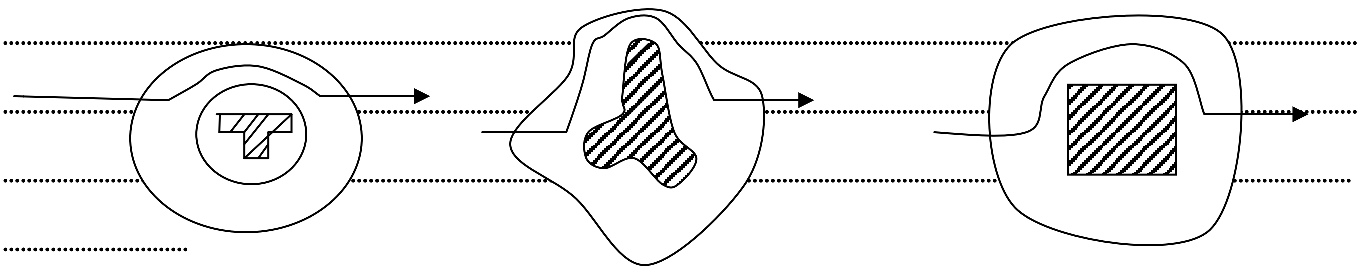

Fig 1 Fig 2 Fig 3

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International Workshop on Water Waves and Floating Bodies

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Breather propagation in shallow water

Author(s): O. Kimmoun, H.C. Hsu, N. Homann, A. Chabchoub, M. S. Li & Y. Y. Chen

Question(s) / Comment(s):

Did you take the varying depth and the varying phase speed and group velocity into account when calculating the wave makes signal? Do you have experience with doing this?

Asked by: Henrik Bredmose

Answer(s):

In the case of breather focusing the solution at the wave maker is chosen as a solution of the Nonlinear Schrodinger Equation(NLSE) in constant depth. In comparison with the focusing of group where you can compute the phase for each frequency component. This solution is a solution of a nonlinear equation and then the focusing comes from a nonlinear process. What it can be done is to introduce this solution in the NLSE in variable bathymetry and verify where the focusing occurs.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Ringing loads on simulation by a lattice Boltzmann method

Author(s): Trygve Kristiansen and Odd M. Faltinsen

Question(s) / Comment(s):

Your study must be credited high. Particularly, experimental results will be very useful. I agree that the wave runup around body is very important. I think that understanding the force due to wave runup is essential for ringing problem. In experiment and/ or computation, can you separate force component, particularly due to wave run up and observe the contribution to ringing phenomenon?

Asked by: Yonghwan Kim

Answer(s):

Thank you. We have attempted to estimate the load due to the run up by integrating the hydrostatic part of the pressure, but this does not seem to explain the whole discrepancy. We are still working on this. 3D CFD could be helpful in solving this. A second model would also be helpful. PIV could be useful too.

Discussion Sheet

The 32nd International Workshop on
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Title of paper: Water entry simulation by a lattice Boltzmann method

Author(s): Xuhui Li, Changhong Hu, David Le Touze

Question(s) / Comment(s):

You have validated your LBM scheme with the Lid drive cavity case in very high Reynolds numbers by comparing the velocity distributions between LBM and other CFD solvers.

Did you compare the pressure in high Reynolds numbers?

Asked by: Pengnan Sun

Answer(s):

In LBM, the pressure is calculated from the density by an equation of state. Therefore, the pressure history shows oscillations.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Calculation of high-order wave loads on a vertical circular cylinder using the SWENSE method

Author(s): Zhaobin Li, Lionel Gentaz, Guillaume Ducrozet, Pierre Ferrant

Question(s) / Comment(s):

By your calculation, did you give any calculation the surface tension? Because of the high frequency (about wavelength) contain in your model from calculation, the surface tension could be important.

Asked by: Robert F. Beck

Answer(s):

In the present work, the free surface tension is ignored in the CFD simulation. It is also the case for the two numerical result by potential flow theory. It is true that the surface tension may have an important contribution of high order force in this small scale set up. More work with taking into account surface tension should be done to confirm it.

The 32nd International Workshop on
Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: A hybrid method for wave interacting with a body floating on polynya confined between two semi-infinite ice sheets

Author(s): Z. F. Li , Y.Y. Shi , G.X. Wu

Question(s) / Comment(s):

Computed results for large frequencies remind me of the results for the tank-wall interference effects, and I guess the present computations with ice-covered sheet can be similar to the situation where a body is oscillation in a confined tank (especially for high frequencies). Do you agree with my understanding?

Asked by: Masashi Kashiwagi

Answer(s):

Thanks for your very kind comments.

The oscillation feature of the body floating on polynya is similar to the situation, where a body in oscillating in a confined tank, but not the same. For the confined tank case, the wave will be totally reflected. However, for wave propagating across the ice covered region, the wave will be partially reflected and the remained part transmitted. Then at a series of wave frequencies, the standing waves will appear in polynya. This causes the oscillation feature of the hydrodynamic coefficients.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Far-field behaviours of steady capillary-gravity ship waves

Author(s): Hui Liang & Xiaobo Chen

Question(s) / Comment(s):

You seem to suggest that the NK theory may not be correct because surface tension is neglected. There is strong numerical evidence that the NK theory may not be a well founded theory, including the NM theory proposed in 2013 in which the line integral in the NK theory is eliminated and the NK theory is shown to correspond to an inconsistent linear flow model?

Asked by: Francis Noblesse

Answer(s):

Thanks for your comments. In the beginning, we thought that the NK problem and ship-motion problems in general are not adequately solved because the integration of Green function over a panel close to the free surface or along a waterline segment is not accurately calculated. That is the reason why we developed the multi-domain method (MDM). By using the MDM, the free-surface Green function is distributed over a smooth surface and accurate results have been obtained since the peculiar singularities and high oscillations of GF are analytically integrated. However, the matrices of BIE are very ill-conditioned. So, we must resort to other models to fix NK problem. Admittedly, NM theory is an improvement of the classical NK theory, and subsequent numerical work shows that the proposed theory is stable and robust due to the removal of waterline integral. We are not sure whether the incorporation of the surface tension (and viscous) effect is helpful to make the NK problem stable, but it is an alternative option as suggested by some mathematicians 0.

0.Destuynder P, Fabre C. A discussion on Neumann–Kelvin's model for progressive water waves. Applicable Analysis, 2011, 90(12): 1851-1876.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Two elastically coupled cylinders in combined wave-current flows

Author(s): Xiangbo Liu, Allan Ross Magee, Wei Bai, Mohammed Abdul Hannan, Aziz Merchant, Anis Hussain, Ankit Choudhary, Bernad A.P. Francis

Question(s) / Comment(s):

I realized the problem treated is rather complicated. For understanding the phenomena and comparison, I guess you will conduct some numerical computations for that purpose. What kind of numerical analyses are you going to use?

Asked by: Masashi Kashiwagi

Answer(s):

We are going to perform CFD simulations to compare with the model tests and carry out further parametric studies to reveal underlying physics. The commercial CFD package, Star-CCM+ has been proved to be a robust tool which can deal with the fluid-structure interactions by using the overset mesh technique. In this software, the current can be easily added to the fluid domain. The waves (including the free surface) are handled by finite volume method with the volume of fluid method modelling the free surface.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Two elastically coupled cylinders in combined wave-current flows

Author(s): Xiangbo Liu, Allan Ross Magee, Wei Bai, Mohammed Abdul Hannan, Aziz Merchant, Anis Hussain, Ankit Choudhary, Bernad A.P. Francis

Question(s) / Comment(s):

Are the cylinders flexible? It seems like it from the video?

Asked by: Dongchi Yu

Answer(s):

The cylinders used in the experiments are made up of rigid PVC pipes. The light refraction and the wide-angle distortion due to the camera used to take the video may give you an illusion that the cylinder is flexible.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Some aspects of coupling the RANS based CFD with the potential flow models for seakeeping applications**

Author(s): **Malenica S., Choi Y.M., Monroy Ch., Seng S., Chen X.B. & Vukcevic V.**

Question(s) / Comment(s):

This is a good strategy to couple CFD viscous flow with potential flows. But how to transfer information between viscous parts and potential part correctly, since we know the viscous part is rotational flow and potential part is irrotational flow. If there is no special treatment for the transformation then some essential information will be lost during the coupling process?

Asked by: **Decheng Wan**

Answer(s):

Thanks for a very good comment which concerns one of the critical points in the coupling procedure. Our point is that the viscous/rotational part of the flow should "die out" more rapidly than the wave part. Indeed the waves are propagating very far from the body while the other phenomena (boundary layer, wake…) are likely to be more localized. This means that we could possibly use different types of blending strategies for wave part and for the viscous parts. The fully consistent separation in between the potential flow and NS will probably not be possible and the approximate solution only could be achieved. As you indicated, a special treatment for the transformation should be made in order to reduce the possible errors. Most probably the dedicated iterative procedure in the blending zone will be necessary. Within the iteration process, one of the parameter which should be checked is the influence of the separation (NS vs potential flow) at the local quantities at the body which represent our final goal.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Some aspects of coupling the RANS based CFD with the potential flow models for seakeeping applications

Author(s): Malenica S., Choi Y.M., Monroy Ch., Seng S., Chen X.B. & Vukcevic V.

Question(s) / Comment(s):

Referring to the work of Campana, he utilized matching at an intermediate boundary between the CFD domain and potential flow domain, and he reported convergence issues for the two-way coupling. With your method of blending, do you have those convergence issues? And is your blending a two way coupling between CFD and potential flow.

Asked by: Paul F. White

Answer(s):

We suppose that you are referring to the paper:
Campana, E., Di Mascio A., Esposito P.G. and Lalli F., 1995: "Viscous – inviscid coupling in free surface ship flows", Int. J. for Numerical methods in fluids,

In that paper the steady wave resistance problem only was considered and indeed the two-way coupling numerical scheme is proposed. This is the good paper and one of the first to consider the coupling of the Navier Stokes and the potential flow solvers for seakeeping applications. The authors discuss the convergence issues and their interpretation is that these problems appear only when the sharp interface in between the two domains (NS and potential flow) is considered. Also they conclude that the small overlapping zone is necessary to remove the convergence problems.

There are however some numerical issues which are not discussed there but we think they will be important in practice. In particular:

1. Separation of the total Navier Stokes solution into the potential flow part and the "rest"
2. Matching of the nonlinear NS solution with the linear potential flow solution at the free surface
3. The size of the overlapping zone and its relation to the size of the Navier Stokes domain

In addition to the above comments, the unsteady problem was not considered and it is very likely that the above mentioned issues will be even more critical for that case.

Our final objective is the two-way coupling for the general seakeeping applications and we are aware of many numerical difficulties which we will face when doing this. The basic principles of coupling will remain similar to the ideas from the above paper (they cannot be significantly different anyway) but some important numerical steps are planned to be performed differently.

Title of paper: Some aspects of coupling the RANS based CFD with the potential flow models for seakeeping applications

Author(s): Malenica S., Choi Y.M., Monroy Ch., Seng S., Chen X.B. & Vukcevic V.

Question(s) / Comment(s):

Thank you for this interesting perspective on an important topic. Yu suggested that it is uncertain how large the CFD domain needs to be in general. To my mind, since waves generated by the ship only carry information away from the ship, it should be as small as possible. Can you comment on this?

Asked by: Harry Bradford Bingham

Answer(s):

Indeed, the final goal of the coupling is to make the CFD domain as small as possible. How to achieve that is the main difficulty! One of the main problems is the separation in between the wave part which carry information far from the ship and the rotational and viscous parts which are likely to have more local character. For the time being it is not fully clear how to proceed when doing that, and most probably this cannot be done fully consistently. Normally the existence of the blending zone should help, because that is the place where we are "allowed to damp" the different parts of the solution separately.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Scattering of flexural-gravity waves by a group of elastic plates floating on the stratified ocean with multiple-layer fluids**

Author(s): **Q. R. Meng, D. Q. Lu**

Question(s) / Comment(s):

What is incident wave used in the analysis?

For M-layer fluid, is there any special model can induce large response of the plates than those in the two layer's fluid?

Asked by: **Bin Teng**

Answer(s):

For two semi-infinite plate, we use a known hydroelastic wave. For the N plate floating on a M-layer fluid, we use a known gravity wave. The purpose of this paper is to study the dynamic response of the structure due to the incident waves, but not to produce a method to reduce the response, which may be another problem to be considered in the future.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Scattering of flexural-gravity waves by a group of elastic plates floating on the stratified ocean with multiple-layer fluids

Author(s): Q. R. Meng, D. Q. Lu

Question(s) / Comment(s):

With your m-layer model you can model a realistic density stratification. when the density varies stepwise, in small steps. Regarding the internal wave modes, typically the mode 1 wave and mode 2 wave are observed and discussed in the literature. Thus a 3 layer model would be sufficient. I wonder if some connection of observationsof the wave modes up to the second mode has been made ?

Asked by: John Grue

Answer(s):

The presented studied is a theoretical model. We agree that a 3-layer model is usually sufficient for the ocean in the viewpoint of physics and application. A multiple-layer model is more elegant in the mathematical point of view. Physically speaking, it is found in the present study the refine stratification model has effects on calculation results for the shear force. Up to now we have no observation data to justify our theoretical prediction.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Modelling wave-ice shelf interactions

Author(s): M. H. Meylan, L. G. Bennetts, R. J. Hosking and O. V. Sergienko

Question(s) / Comment(s):

A simple physical issue: The wave frequency that you mentioned seems to have the order of 100sec. Is it valid in real Arctic Ocean?

Asked by:

Answer(s):

There are very low frequency waves called intra-gravity wave which are of periods 80-300s. The article in Wikipedia is an excellent reference.

Discussion Sheet

The 32nd International Workshop on
Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Modelling wave-ice shelf interactions

Author(s): M. H. Meylan, L. G. Bennetts, R. J. Hosking and O. V. Sergienko

Question(s) / Comment(s):

You are using a shallow water approximation. Is that a plausible assumption for the typical ice shelf application, and have you looked into generalization to arbitrary water depth?

Asked by: Malin Göteman

Answer(s):

It is a simplification and to make accurate prediction the theory must be extended to finite depth.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Modelling wave-ice shelf interactions

Author(s): M. H. Meylan, L. G. Bennetts, R. J. Hosking and O. V. Sergienko

Question(s) / Comment(s):

With your ice sheet being about 400 times longer than the depth, and the wave length being also much longer than the depth, with $L \gg \lambda \gg h$, is it possible to capture some leading order behaviour of the most important leading flexural modes, by doing approximation at the ice edge? How many modes are really leading?

Asked by: John Grue

Answer(s):

I think the large mode number modes ($n \geq 10$) can be approximated by the edge behaviour. However the lowest modes are probably the most important.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: On resonant modes in moonpools with restrictions or recesses

Author(s): Bernard Molin, Xinshu Zhang

Question(s) / Comment(s):

In your last example, your predicted 1st mode frequency was lower than the experimental values.

Can you comment on what physical effects might explain this?

Asked by: Harry Bradford Bingham

Answer(s):

The response might be high. In our model, the ship is held fixed, whereas, in the experiment, it is free to respond to the waves.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Numerical and experimental study on water exit and re-entry of a fully-submerged buoyant body

Author(s): B.Y. Ni, Q.G. Wu

Question(s) / Comment(s):

In the previous section, the presentation by Tassin et al, shows us the evolution of the contact line during the water exit of flat plates. I saw from your video that the contact line of the exit of a sphere is more complex. There seems to generate some cavities and vicious flow separations. Can you just comment on that?

Asked by: Pengnan Sun

Answer(s):

Yes. Due to the high speed of the blunter body, there exits cavities formed after the sphere chirring its free water exit. The cavities may be formed due to the negative pressure region as a result of the into ration between vortex shedding and the surface. Unfortunately, potential flow theory ignores the viscosity of fluid, so these phenomena cannot be simulated by using potential flow theory. Recent CFD method may be a good option on these phenomena, such as SPH, LBM, et al. last year we just concerned the critical density, rather than the cavity, so BEM was still applicable.

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Second order wave induced actions for parametric rolling

Author(s): Julio Cesar F. Polo, Armin Troesch, Marcelo A. S. Neves

Question(s) / Comment(s):

The behaviour in roll response looks like a chaotic phenomenon, and it is well known that chaotic responses are very sensitive to initial condition.

In your simulation, did you explain the sensitivity of the result to initial condition?

Asked by: Alain H. Clément

Answer(s):

In deed parametric rolling is a very chaotic phenomenon. But for irregular sea, it is more important the encounter of a sequence of waves of the same frequency tuned with roll natural frequency. So the influence of initial conditions is minimal.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: The kinematics in a plunging breaker revisited

Author(s): Y.-M. Scolan

Question(s) / Comment(s):

1. What is the main difference for plunging breakers in deep water and shallow water?

2. As the viscous effect is missing in potential flow, have you considered to compare the shape maximum? velocity for plunging jets obtained between potential flow and full Navier-Stokes simulations?

Asked by: Zhihua Xie

Answer(s):

1. In the context of the present study of plunging breakers, the main difference is the fact that the fluid in front of the plunging breaker in shallow water is almost at rest (the front free surface is almost flat), while in deep water the fluid mass in front of the plunging breaker moves upwards (the front free surface is not flat).
2. No, it is expected that viscous effects do not play an important role, unless the crest completely overturns and then the jet hits the fluid mass. The conclusion of the paper by Laurent Brosset (IWWWWFB 2017) confirms that result. Surface tension may play a more important role.

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: The kinematics in a plunging breaker revisited

Author(s): Y.-M. Scolan

Question(s) / Comment(s):

Thank you for a very nice and detailed analysis.

Is the critical breaker stable to a change of the initial condition? I'd expect it to occur due to growth of an unstable perturbation.

Asked by: Henrik Bredmose

Answer(s):

Thanks for your suggestion to study the stability of the jet in terms of perturbation of the initial condition.

Discussion Sheet

The 32nd International Workshop on
Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Asymmetric water-entry of a wedge with rolled-up vortex sheet

Author(s): Yuriy A. Semenov, Guo Xiong Wu

Question(s) / Comment(s):

Would you please explain how you determine the position of the vortex, point E?

Asked by: Harry Bradford Bingham

Answer(s):

The position of the isolated vortex at point E is determined in calculations as a centroid of the lost coil of the spinal vortex line.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Action of periodic external pressure on inhomogeneous ice cover

Author(s): Izolda V. Sturova and Larisa A. Tkacheva

Question(s) / Comment(s):

Why did you choose the form of the forcing function *f*?

Asked by: Decheng Wan

Answer(s):

The axisymmetricprolificdistillation of the function f was populace for the study of external pressure action on infinitely extended homogeneous ice (see, for example, CleckesovL.V. (1953) "surface and interface waves"). In our research, we can use any localized external pressure. Use of the delta-function for the function f can give us physical effects in source cases.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Nonlinear water wave interaction with floating bodies using δ^{+} -SPH model**

Author(s): **P.N. Sun, A. Colagrossi, S. Marrone, A.M. Zhang**

Question(s) / Comment(s):

1. Breaking waves are normally three dimensional and turbulent interfacial flow. As the simulations are two dimensional and without any turbulence modelling, do you have any comment on that please?

2. Air entrainment after wave breaking is very important, have you considered the surface tension effect?

Asked by: **Zhihua Xie**

Answer(s):

1. Yes, I agree. But at the present stage, we don't have any good turbulence model. So we have to use a direct numerical simulation (DNS) by mostly improving the particle resolution to capture as much as possible the vortex structures. Regarding the two dimensional simulations, it is straightforward to extend them into 3D, but that requires more computational cost.
2. No. for the numerical results here, I didn't consider the air phase. Therefore, the surface tension force is most taken into account. But the multiphase model in SPH has been very nature. We can add air particles above the free surface to see their effects on the breaking wave.

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The 32nd International Workshop on
Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Nonlinear water wave interaction with floating bodies using δ^{+}-SPH model

Author(s): P.N. Sun, A. Colagrossi, S. Marrone, A.M. Zhang

Question(s) / Comment(s):

1. Since SPH method has low resolution and oscillation characters, it is very hard to capture flow separation and boundary layer, especially for high Re flows. How do you use SPH to simulate viscous flow with Re=2000?

2. For flow around aerofoil, you use different size particle along x-computational zone, why does the vortex not dispersion?

3. SPH for water wave is good, but it cannot capture very detailed structural of wave flow, especially wave-breaking. How can you simulate the wave breaking of ship so good?

Asked by: Decheng Wan

Answer(s):

1. We use the recently developed δ^{+}-SPH model, which can solve very well the boundary layer problems when the particle resolution is very fine.

2. Yes. Even the particle resolution is different, but, the viscous force is the same. Since the Reynolds numbers are all the same in the whole domain, the vortex structures can stand for very long time.

3. I simulate the ship bow wave using 2D+t model. That means it is actually a 2D simulation. In each cross-section, I can use very refined particle resolutions to capture all the details of the breaking wave. After I solve all the cross sections, I reconstruct the flow into 3D and show the 3D flow phenomena.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Evolution of the contact line during the water exit of flat plates

Author(s): Alan Tassin, Thibaut Breton, Nicolas Jacques

Question(s) / Comment(s):

1. In the experiments, the velocity and acceleration oscillates. So in your numerical simulation, did you use the constant speed or the exact velocity obtained from experiments?

2. It seems in your side view of the water exit of a circular disk that the picture is very dark. Thus the profile of free surface is hard to capture in side view. I suggest to use a light source behind the water or near the side camera, in order to make the view lighter and the profile clearer?

Asked by: Baoyu Ni

Answer(s):

1. We did both. We performed numerical simulations with constant acceleration without gravity to compare with the analytical model of Korobkin. We also performed numerical simulations using the acceleration recorded during an experiment and with gravity in order to compare with the experiments.

2. Indeed, we aimed at illuminating a white background placed behind the water column in order to have a good contrast. With this technique, the water appears in dark and the background is bright. This technique is the so-called "shadowgraphy" technique. Based on my experience and the literature (see for example Vega, E.J., Montanero, J.M. & Fernández, On the precision of optical imaging to study free surface dynamics at high frame rates, J. Exp Fluids (2009) 47: 251.), this a reliable technique for the measurement of a free-surface profile. Using a light near the side camera would lead to a poorer contrast between the water and the background, and the free surface profile would be more difficult to identify.

Title of paper: Evolution of the contact line during the water exit of flat plates

Author(s): Alan Tassin, Thibaut Breton, Nicolas Jacques

Question(s) / Comment(s):

I was amazed to see good agreement in the contact point position between Korobkin's simplified theory and measurement, but it was not the case for the force. Is there any idea for improvement of Korobkin's theory? Did you see good agreement between CFD computation and measurement for both contact point and force?

Asked by: Masashi Kashiwagi

Answer(s):

There seems to be a good agreement between Korobkin's model and CFD for constant acceleration and no gravity in terms of contact point position for the parameter "gamma=1", but the agreement in terms of force is better for "gamma=2" (this the value suggested by Korobkin for a good prediction of the force in Korobkin, A. A. (2013). A linearlized model of water exit. Journal of Fluid Mechanics, 737, 368-386). In the experiments the acceleration oscillates a lot and gravity should be taken into account, so it is hard to compare with the analytical model of Korobkin at constant acceleration and without gravity, but you are right, the agreement in terms of contact point position is surprisingly good given the different conditions of the water exit. We did not measure the force so far in the experiments. The numerical simulations and the experiments are not in very good agreement so far in terms of contact point position. Additional work has to be performed on both aspects in order to understand the reasons for these differences.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Scattering of periodic surface waves by a two dimensional platform supported by a pile array

Author(s): Benlong WANG, Xiaoyu GUO, Hua LIU

Question(s) / Comment(s):

Thank you for the nice presentation.

Can you comment on the effect of viscosity on the reflection and transmission frequency? It appear that the relation $C_R^2 + C_T^2 = 1$ is no longer applicable here, perhaps due to the viscosity. Can you comment on this?

Asked by: Masoud Hayatdavoodi

Answer(s):

Yes, the non-conservation of wave energy is observed, i.e. $C_R^2 + C_T^2 < 1$, when eddy viscosity is included. Due to the viscosity dissipation, the reflection wave and transmission wave reduce apparently.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Scattering of periodic surface waves by a two dimensional platform supported by a pile array

Author(s): Benlong WANG, Xiaoyu GUO, Hua LIU

Question(s) / Comment(s):

How is the numerical result sat $kh = 0$ computed?

Why the reflection coefficient for the platform with piles is not zero at kh=0?

Asked by: Bin Teng

Answer(s):

In the derivation, we assume kh is order of 1. The numerical results for $kh \to 1$ is the limiting case of the proposed method. When $kh = 0$, the reflection coefficient will approach to zero. In the results, we calculate for $kh = 0.01$, thus the reflection coefficient is not zero.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Wave effects on free running ship in standard zigzag maneuver**

Author(s): **Jianhua Wang and Decheng Wan**

Question(s) / Comment(s):

(1) What turbulence model and wall treatment did you use?

(2) Do you believe that the flow is separated (massively)? Do you think that $k-\omega$ with a wall-function can accurately predict unsteady separation?

(3) What value ofVCG did you use? And what value was reported in the experiment?

Asked by: **Kevin J. Maki**

Answer(s):

Wehave not yet investigated the wave resistance but the first step is to resolve the challenges we are having in the wake, which is ongoing work.

(1) For turbulence model, we use the $k-\omega$ SST model, and near wall treatment applies the wall function.

(2) For the flow separation on the rudders, we can check the results from the comparison of the zigzag motion since there is no available measurement data. The predicted results of zigzag trajectory and ship motions are determined by the lateral force from the rudders, so the flow around rudders are mostly correct as the comparison matches well with the experiment. For $k-\omega$ model with wall function can at some extend give the unsteady separation.

(3) The VCG in the simulation is set according to the experiment performed at IIHR.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Velocity decomposition analysis of free surface flow

Author(s): Paul F. White, Yang Chen, Kevin J. Maki and Robert F. Beck

Question(s) / Comment(s):

After taking viscous effect into consideration, is there an improvement of wave resistance prediction?

Asked by: Dongchi Yu

Answer(s):

Wehave not yet investigated the wave resistance but the first step is to resolve the challenges we are having in the wake, which is ongoing work.

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Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: **Local-flow component in the Green function for diffraction radiation of water waves**

Author(s): **Huiyu Wu, Yi Zhu, Chao Ma, Wei Li, Decheng Wan, Francis Noblesse**

Question(s) / Comment(s):

1. Polynomial approximations are used. Are they stable?
2. Can you give a theoretical estimate of numerical errors?

Asked by: **Zhi Zong**

Answer(s):

Thank you for your questions.

(1) The substitution $0 \le \rho \le d/(1+d)$ is performed to derive the approximations to the local flow components. $A(\rho), B(\rho), C(\rho), D(\rho), A_*(\rho), B_*(\rho), C_*(\rho)$ are polynomials of ρ. These polynomial are not sensitive to ρ because ρ varies within the range $0 \le \rho \le 1$. Thus the method is stable.

(2) Asymptotic analysis and numerical analysis of absolute and relative errors, and numerical analysis of global errors are given. The analysis solves that the approximations are accurate enough for most practical purposes. Thetheoretical estimate of errors is not considered in the present study and will be considered in further study.

Title of paper: Experimental and numerical studies on Di-hull interference

Author(s): Dongchi Yu, Lu Wang and Ronald W. Yeung

Question(s) / Comment(s):

Even after taking account of the effect of trim and sinkage, we can see a noticeable difference from measured values for the interference parameter. What do you think the reason of this difference?

Asked by: Masashi Kashiwagi

Answer(s):

Three reasons may account for such discrepancy:

1. The utilization of flat-plate assumption and ITTC formula for C_f may not fully account for the frictional drag of a component hull of a di-hull system;

2. The wave elevation between component hulls is high that the implementation of linearized free surface condition may introduce bias;

3. α values acquired from experiments are highly sensitive to the small fluctuations of force measurements.

Discussion Sheet

The 32nd International Workshop on Water Waves and Floating Bodies

April 23-26, 2017, Dalian, China, hosted by Dalian University of Technology

Title of paper: Solving 2D coupled water entry problem by an improved MPS method

Author(s): Ruosi Zha, Heather Peng and Wei Qiu

Question(s) / Comment(s):

At the entry time of the object, air bubbles are formed between water and fluid. This seems to be due to cavitation. Can you comment on how the MPS model simulates the cavitation process, i.e., how is this considered in the governing equation?

Asked by: Masoud Hayatdavoodi

Answer(s):

There is only one phase simulated in the present fluid analysis. Because of the elastic of the wedge, the structure can start bending in other direction (upwards) after it reached its maximum deformation. If deformation is small, the wedge should stay in contact with water when deformation is too large, the wedge may detach from the fluid and air can enter from the side, leading to air cushion or cavitation. No special equations are considered.