

# 行政院國家科學委員會專題研究計畫 期中進度報告

## 自由液面與渦流流場之研究(2/3)

計畫類別：個別型計畫

計畫編號：NSC91-2611-E-002-006-

執行期間：91年08月01日至92年07月31日

執行單位：國立臺灣大學土木工程學系暨研究所

計畫主持人：楊德良

計畫參與人員：Dr. Murugesan (墨魯金), 詹淑菁, 羅德章, 黃迪僑, 阮智偉

報告類型：精簡報告

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中 華 民 國 92 年 5 月 26 日

## Study of Free Surfaces and Vortical Flows

### NSC 91-2611-E-002-006 research project progress report

The three-year research program pursues the developments of numerical study of the free surfaces and vortical flows. This is the second year progress report for the three-year NSC research project. The project is going on very well, by the end of this month (May 31, 2003), we have finished the following achievements, a total of 7 papers published or submitted, without counting some conference papers, papers in preparation, reports, or the research works of MS and Ph.D. students.

In the following listings, only the most important and representative works are stated. For brief purposes, we will not include the in-going works mentioned above, such as some selected conference papers, the papers under preparation, the reports, and the research works of MS and Ph. D. thesis or dissertation. In conclusion, the status of the research project is under control and is in a very good standing status, as far as the project progress is concerned. We shall include all the paper (include the followings) in the final complete report at the third year.

1. Young, D.L., Lin, Q.H., Murugesan, K, Two-dimensional simulation of density currents due to sediment-laden inflow into a thermally stratified reservoir, submitted to the Journal of Hydraulic Research, IAHR, under review
2. Murugesan, K., Young, D.L., Effect of mass lumping in the study of three-dimensional diffusion problem using isoparametric elements, submitted to the Journal of Computer Modelling in Engineering and Science, under review.
3. Lo, D.C., Young, D.L., Arbitrary Lagrangian-Eulerian finite element analysis of free-surface flow using a velocity-vorticity formulation, submitted to the Journal of Computational Physics, tentatively accepted, under revision.
4. Young, D.L., 2002, Finite element analysis of stratified lake hydrodynamics, in Chapter 10 of Environmental Fluid Mechanics-Theories and Applications, ASCE monograph, pp339-376.
5. Lo, D.C., Young, D.L. Numerical solution of three-dimensional velocity-vorticity Navier-Stokes equations by finite difference method, submitted to the International Journal for Numerical Methods in Fluids, under review.
6. Lo, D.C., Young, D.L., Numerical simulation of solitary waves using arbitrary Lagrangian-Eulerian velocity-vorticity formulation, submitted to the Journal of Computer Methods in Applied Mechanics and Engineering, Special issue on "Arbitrary Lagrangian-Eulerian Formulation", under review.(invited paper)

7. Lo, D.C, Young, D.L.,2002,Numerical techniques for fully nonlinear water waves using a velocity-vorticity formulation, Proceedings of the fifth International Conference on Hydrodynamics,(ICHHD2002)Tainan,Taiwan,Oct,31-Nov.2,2002,pp407-412.