NUMERICAL ALGORITHMS FOR FLOWING-THROUGH PROBLEM OF AN IDEAL INCOMPRESSIBLE FLUID
THESIS ADVISOR: ASSOC. PROF. DR. NIKOLAY MOSHKIN, Ph.D.
115 PP. ISBN 974-533-024-8

NUMERICAL ALGORITHM / FLOWING–THROUGH / IDEAL / INCOMPRESSIBLE FLUID / IMPERMEABLE / FINITE-DIFFERENCE / EULER EQUATIONS / VORTICITY

This thesis is involved with a numerical method for an ideal incompressible fluid flow through a bounded domain with inflow, outflow and impermeable parts of the boundary. The finite-difference scheme is used to solve the Euler equations for certain geometries of flow domain and boundary conditions. The numerical algorithms can be useful in predicting flows for three different kinds of boundary conditions on inflow and outflow parts of the channel boundary.

In the first case it is given the tangent components of vorticity and normal component of the velocity vector on the inflow parts of domain boundary and only the normal component of the velocity vector on the outflow parts of channel boundary.

In the second case is given the whole vector of the velocity on inflow parts of domain boundaries and only the normal component of the velocity vector on the outflow parts of channel boundary.

In the third case the boundary condition on the inflow parts of the domain boundary is the same as in the second case and on the outflow parts only the pressure is given.

มหาวิทยาลัยเทคโนโลยีสุรนารี

School of Mathematics Student _____

Academic Year 2001 Advisor _____

Acknowledgements

I would like to express my sincere gratitude to my advisor Assoc. Prof. Dr. Nikolay P. Moshkin, School of Mathematics, Institute of Science, Suranaree University of Technology for his kind guidance and support throughout the course of this research. I have been working under his invaluable supervision for about five years and have had many unique research experiences which I will cherish throughout my life.

I am also very grateful to and would like to thank the Chairman of the School of Mathematics of Suranaree University of Technology, Assoc. Prof. Dr. Prapasri Asawakun and all the lecturers who taught and helped me during my study in Suranaree University of Technology. They are Assoc. Prof. Dr. Suwan Tangmanee, Assoc. Prof. Dr. Pairote Sattayatham, Prof. Dr. Sergey V. Meleshko, Assoc. Prof. Dr. B.I. Kvasov, Asst. Prof. Dr. Eckart Schulz and Asst. Prof. Dr. Arjuna Chaiyasena for their help, advice and support.

I want to express my appreciation to Anirut Laudsong, Paladorn Suwannapho, Apichai Hematulin, Asst. Prof. Supot Witayangkurn, Jessada Tantanuch, Dr. Wei Wei, Mana Kaomek and Anusorn Ruchirabha for their invaluable professional guidance and friendly encouragement.

In addition, I wish to express my special thanks to Rajabhat Institute Petchburiwittayalongkorn and Government of France for offering the scholarship which enabled me to continue my advanced studies in Suranaree University of Technology, Thailand.

มหาวิทยาลัยเทคโนโลยีสุรนารี

Peiangpob Mounnumprang