AN ANALYSIS OF NATURALLY-INDUCED WATER MOTION WITHIN BOTH OPEN AND CLOSED BASINS

by

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SUMMARY

This thesis describes two numerical models for the analysis of naturally induced water motion with emphasis on tidal flow. The first of these models is based upon a two-dimensional system of depth-integrated equations. The result of the depth integration is a system of differential equations in which the unknowns are two flow variables and the displacement. The second model is a three-dimensional depth-contour model which is based upon a system of equations which has been non-dimensionalized over depth. This non-dimensionalization allows a more detailed analysis to be made in areas of shallow water.

The two models are verified by first comparing results obtained from the models with analytic solutions for similar situations. Secondly, the results of the two models are compared. Aseries of numerical tests are then performed to see the effect of varying certain parameters, in particular the vertical eddy viscosity, on the model predictions. Finally, comparisons are made with results obtained from data measurements taken in the South Australian Gulf system. A brief analysis is then made of tidal velocities in this particular situation.

The results obtained from both the analytic and real comparisons indicate that models are likely to be suitable for predictive purposes.

SIGNED STATEMENT

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma in any University and, to the best of my knowledge, it contains no material previously published by any other person, except where due reference is made in the text of the thesis.

B. Webber.

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