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Thesis Title	The Development of a Mathematical Model for Predicting the Distribution of Water Quality Parameters in Songkhla Lake
Thesis Credits	12
Candidate	Mr. Chakkrit Saiyachot
Supervisor	Dr. Tavicha Buranathanitt
Degree of Study	Master of Engineering
Department	Civil Engineering
Academic Year	2001

Abstract

This thesis studied and developed the mathematical model of water quality in 2 dimension with average depth under unsteady state conditions. The objective is to predict the distribution of water quality indices in Song Khla lake. The model development was based on the momentum and continuity equations and the energy conservation equation for the hydrodynamic model and water quality model, respectively. The Alternating-Direction-Implicit (ADI) numerical method (Abbot Scheme) was used to solve the control equation of the hydrodynamic model. Meanwhile, the water quality model solved by the ADI method using the QUICKEST Scheme and the 4th Order Rungkutta technique was found the biochemical equation of the 11 water quality indices : Salinity, Water temperature, Chlorophyll-A, Organic Phosphorus (OP), Phosphate (PO_4), Organic Nitrogen (ON), Ammonia (NH_3-H), Nitrate (NO_3-H), Dissolved Oxygen (DO), BOD, and other user defined toxic substances. Both models use the Fortran Computer Language to construct the command procedures and to display the computational results in PC computer graphic.

From the calibration, investigation and prediction with the recorded Song Khla data , it is found that the results of model are in good conditions, especially the calculation of the dispersion of the main water quality indices (DO and BOD). The other results of water quality indices are in acceptable criterion. The models of this study are able to use as the equipment for

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predicting the impactions in water resources projects and managing the environment and ecological systems for the shallow and wide water resources confidently.