PARAMETER OPTIMIZATION IN FLOOD ROUTING

Thesis

by

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ABSTRACT

This research introduces the influence coefficient algorithm. A simple, easily implemented and rapidly convergent computational procedure for the solution of the parameters optimization problem in unsteady open channel and velocity distribution at one or more points along the channel. The algorithm starts with the assumption of some initial estimates for parameters in the feasible region. The governing equation is solved by implicit or explicit method and the objective function is evaluated which is then minimized. (Optimization is a mathematical process whereby the embedded paratmeters in differential equation defining a system are estimated from observations of system input and output.) The parameters specifically chosen for optimization are the two, the width "B" of channel (for channel geometry) and Manning's "N" (for Hydraulic characteristics). These parameters are not easy to measure physically and have to be determined from the solution of mathematical model using concurrent input and output measurements. An effective formulation of the algorithm depend on certain stability and convergence related to the finite difference solution of the governing equations specifically in case of explicit method. Explicit and implicit methods are modeled separately. However in implicit method coefficient A_1 in wetted perimeter equation $P=A_1 \times A^B$ is taken as parameter instead of "B".