COMPARISON OF NATURAL CHANNEL MODELLING PACKAGES FOR USE IN FLOOD PROTECTION DESIGN

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Abstract

The computer modeling of unsteady flow is a new product of the computer area, which combines the knowledge on open channel flow, unsteady flow hydrodynamics, numerical mathematics and analysis and transform them to a powerful devise for hydro science investigation. In modeling and simulation, three major elements – prototype (or real system), model and computer – and two relationships – modeling and simulation – are involved. These three elements and two relationships essentially characterize the process of modeling and simulation; they define the mechanism of activities associated with constructing models of real-worlds systems and simulating them in the computer. The procedure for computer modeling and simulation starts with the selection, examination/derivation of basic partial differential equations to properly describe the unsteady flow of interest, followed by a suitable numerical method for solution of equations, modifications and extension of the basic numerical algorithms in order to be both workable and practical. The present day computational hydraulic attaches great importance to the practical aspects of numerical modeling: development and expansion of algorithms for adaptation to the real world of unsteady open channel flow, actual building of numerical simulation models from programming and from engineering viewpoints. The above mentioned features and aspects are the basics for computer software comparisons.Development of river models for unsteady flow conditions and using these models in flood protection design is crucial to reduce the effects of the floods and flooding on people, properties and environment. All numerical computations developed nowadays are based on the Saint Venant differential equations, but the mathematical treatment for the solution of these equations, especially the method of solution and solution scheme employed is differently used by different computer programme makers. The main aspect of such differences and their consequences in the numerical stability, accuracy and convergence and in real-world river model, will be the subject of this paper.

Keywords**:** *modeling, unsteady flow, simulation, numerical computation, hydrodynamics*.