

Exponential Basis Functions in Simulation of Solitary Wave Propagation

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Abstract

The assessment of Tsunami propagation in the sea and ocean is the primary aim of this research. Tsunami propagation is generally simulated by solitary waves. In this research, for the simulation of solitary wave propagation in fluid with free surface, an exponential basis functions meshless method is introduced. The formulation of this method is based on Lagrangian form of Navier-stokes equations for non-viscous fluids based in pressure. In this regard, the Laplace equation of pressure is solved at each time step. Then, the geometry is updated based on the Lagrangian formulation of the motion through an implicit algorithm. Considering the changes of geometry in simulation time, the introduced meshless method is efficient and very quick in calculations. The results for water surface profile before breaking are in good agreement with experimental data.

Keywords: *Solitary wave, Meshless method, Exponential basis functions, Lagrangian formulation, Non-viscous fluid.*
