

عنوان مقاله:

Investigation of physical issues of the initial conditions of free water surface due to underwater disturbances on the basis of SPH numerical simulation of the phenomenon

محل انتشار:

فصلنامه فیزیک تئوری و کاربردی، دوره 13، شماره 1 (سال: 1398)

تعداد صفحات اصل مقاله: 20

نویسندگان:

*Ocean Engineering and Technology Research Center, Iranian National Institute for Oceanography and - - -
(Atmospheric Science (INIOAS*

*Ocean Engineering and Technology Research Center, Iranian National Institute for Oceanography and - - -
(Atmospheric Science (INIOAS*

(Darya-Bandar Consulting Engineers (DBC - - -

خلاصه مقاله:

AbstractThe current paper discusses the physical impacts of the various initial boundary conditions of the free surface of a waterbody on the initiation and propagation characteristics of water waves due to the underwater perturbations. Differences between traditional point of view and applied numerical method in this paper for exertion the initial conditions of the generated waves by surface deformation were surveyed in the Lagrangian domain vs. Eulerian. In this article, the smoothed-particle hydrodynamics (SPH) technique was applied for simulating of wave generation process using initial boundary condition of water surface deformation through utilizing DualSPHysics numerical code and comparing the modeling results with recorded data. As a distinct approach, we studied the effects of discrete water particles on properties of produced surface waves by using the Lagrangian analytical capability of SPH model. Illustrative compatibility on simulation results with experimental data proves that meshless techniques such as applied in DualSPHysics software can reproduce physical properties of the event very well, and this is a suitable alternative to existing classical approaches for prediction of shock occurrences with nonlinear behavior such as generated surface water waves by underwater disturbance. Besides, the waveforms and their characteristics behave more realistic by considering the thrown upward water mass which was not directly considered in old formula and theories. The results of numerical modeling indicated rational agreement between numerical and empirical data proving that a complicated nonlinear phenomenon could be predicted by an SPH model which modified initial boundary conditions were supposed into the model with actual assumptions.

کلمات کلیدی:

Underwater disturbance, Smoothed, particle hydrodynamics (SPH), Initial conditions of free surface, Explosion, generated water waves

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1398246>



