



Riding waves generated by short-term underwater disturbances

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In this paper, we analyze the piston mechanism of wave formation which is modeled in the framework of mathematical formulation involving fully nonlinear Euler equations of infinitely deep ideal fluid with submerged compact wave-maker. We apply semi-analytical method [1,2] based on the reduction of nonlinear water wave problem to the integral-differential system for the wave elevation together with normal and tangential fluid velocities at the free surface. Asymptotic solution taking into account higher-order nonlinear terms is constructed explicitly in the case when the wave-maker has the form of circular cylinder. This solution describes non-stationary free surface flow including an initial stage of the formation of splash-jet above a vertically submerging wave-maker. It is demonstrated that this approximate solution can simulate generation of small-scaled waves which propagate along the curvilinear free surface with non-constant phase speed.

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References

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