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Traveling water waves along quartic bottom profile

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The problem of transmission of wave energy in strongly inhomogeneous media is discussed with an application to long water waves in the basin of a quartic bottom profile. It is shown within the linear shallow-water theory that the wave component of the flow disturbance is described by the traveling wave solution, which amplitude and phase varies with a distance. That means that a kinetic part of the wave energy propagates over large distances without reflection. Conditions of the wave breaking in the nearshore are found from the asymptotic solution of the nonlinear shallow-water theory. The wave runup on a vertical wall is also studied for such bottom profile.