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Numerical simulation and wavelet analysis of the transient wave groups

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The formation of the rogue wave from the transient wave groups is studied for shallow water in the framework of the Korteweg – de Vries equation. The major aim of this paper is to clarify the features of transient wave groups leading to appearance of the rogue wave of special shape (crest only, deep trough, high crest with long and shallow trough, “three sisters”, and so on). Numerical simulations are performed for linear waves as for weakly nonlinear waves as well. The initial conditions correspond to the rogue waves of expected shape, and the details of wave groups evolving from rogue waves are determined. Using the invariance of the Korteweg – de Vries equation, these transient groups are expected to produce the rogue waves. The wavelet analysis is applied to demonstrate the features of transient wave groups associated with expected shape of the rogue waves.