

The interaction of solitary waves in the Zakharov Water Waves system under a slowly varying bottom

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We deal with the generalized solitary wave problem for the Zakharov water waves system with surface tension and a non-flat bottom, in one dimension. Amick-Kirchgässner in 1989 proved the existence of small solitary waves in the case of a finite flat bottom. However, in practical situations, the bottom is always non-constant. In this work, we advance in this direction and consider a fluid with a slowly varying (in space) bottom and consider the problem of existence and long time behavior of a generalized solitary wave. Our main result establishes that, under suitable conditions on the variation of the bottom, such a generalized nonlinear wave exists and interacts with the bottom in a well-defined fashion, exiting the interaction region with well-defined final parameters. .

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