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Numerical Study of Solitary Waves in a Channel LYUDMYLA BARANNYK, University of Michigan, WOOYOUNG CHOI, New Jersey Institute of Technology, ROBERT KRASNY, University of Michigan — We investigate the dynamics of large amplitude internal solitary wave solutions of Euler equations in a channel using a vortex sheet model discretized by a point vortex method. The initial conditions are taken to be traveling solitary wave solutions of a strongly nonlinear long-wave model studied by Jo and Choi [Stud. Appl. Math. 109 (2002) 205–227]. The approach uses a boundary integral representation in which the fluid interface is modeled by a free vortex sheet and the channel walls by bound vortex sheets. We validate numerical results first by considering the case when channel is flat and horizontal. We simulate the interaction of two solitary waves and also study the deformation of a solitary wave propagating over non-uniform topography. The goal is to compare our numerical results using the vortex sheet model to those obtained using the long-wave model cited above.

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