1023-76-1616 **Lyudmyla Barannyk*** (barannyk@umich.edu), Department of Mathematics, University of Michigan, 530 Church Street, Ann Arbor, MI 48109. *Numerical Simulations of Vortex Sheets and Electron Sheets Using Boundary Integral Methods.*

We apply boundary integral methods to simulate interfacial dynamics in two dimensions for the following three problems. (1) We consider a system of density-stratified incompressible inviscid fluids in a infinite horizontal or tilted channel. The fluid interface is modeled as a free vortex sheet and the channel walls as bound vortex sheets. The behavior of the interface between fluids with full density jump is studied numerically using the vortex blob method. The goal is to simulate the flow in the inclined channel and compare the numerical results with the experimental results obtained by Thorpe [J. Fluid Mech. 46 (1971) 299–319]. (2) The approach is similar but we use a point vortex method to investigate the dynamics of large amplitude internal solitary wave solutions of Euler equations in a channel. 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]. We compare our numerical results using the vortex sheet model to those obtained using the long-wave model. (3) We apply a grid-free particle method for electrostatic plasma simulations using a Lagrangian formulation for charge density with electron sheet initial data. (Received September 26, 2006)