

Meeting: 1001, Evanston, Illinois, SS 11A, Special Session on Stability Issues in Fluid Dynamics

1001-76-299 **Stephane Leblanc*** (sl@univ-tln.fr), LSEET/CNRS, University of Toulon-Var, BP 20132, 83957 La Garde cedex, France, and **David Guimbard** (guimbard@lseet.univ-tln.fr), LSEET/CNRS, University of Toulon-Var, BP 20132, 83957 La Garde cedex, France. *Stability of Lagrangian ideal flows.*

A general method is presented to investigate the hydrodynamic stability of ideal incompressible or barotropic flows described in Lagrangian representation. Based on the theory of short-wavelength instabilities (Bayly 1987; Friedlander & Vishik 1991; Lifschitz & Hameiri 1991), the problem is reduced to a transport equation which involves only the distortion matrix $\partial\mathbf{X}(t; \mathbf{a})/\partial\mathbf{a}$ of the equilibrium flow. The theory is applied to Gerstner's rotational free-surface gravity waves (von Gerstner 1802) and to the class of rotational flows discovered by Abrashkin & Yakubovich (1984). Several stability criteria are derived and compared to numerical computations. (Received August 30, 2004)