FM13S_10487

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Nonlinear Mechanics of Wavy Instability of Steady Longitudinal Vortices and Drag Rise in Boundary Layer Flow

J.T.C. Liu[(1)], I.G. Girgis[(2)]

(1) *Division of Engineering and the Center for Fluid Mechanics, Brown University, Providence, USA*
(2) *Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, USA*

Wavy secondary instability of steady longitudinal vortices in boundary layer flow is studied. The nonlinear interaction problem is parabolized through scaling obtained from observations. Emphasis is placed on the nonlinear modification of the steady, averaged problem by the Reynolds stresses of the wavy disturbance. It is found that the skin friction in such a modification process increases well above the local turbulent boundary layer value.

View the extended summary