Inviscid instability of a unidirectional flow sheared in two transverse directions

Linear inviscid stability of general unidirectional flows sheared in one transverse direction has long been investigated by numerous researchers using the Rayleigh equation. However, unlike the simple shear flow considered in this equation, most physically relevant unidirectional flows vary in two transverse directions. Here the inviscid instability of such flows is studied by the large−Reynolds−number limit asymptotic analysis. We derive an a priori necessary condition for the existence of a limiting neutral mode, and develop a new numerical method to accurately capture singular neutral modes.