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Stability analysis of Boundary Layer in Poiseuille Flow through a modified Orr-Sommerfeld equation JEAN BIO CHABI OROU, Université d'Abomey-Calavi, VINCENT MONWANOU, CLÉMENT MIWADINOU, None — For applications regarding transition prediction, wing design and control of boundary layers, the fundamental understanding of disturbance growth in the flat plate boundary layer is an important issue. In the present work we investigate the stability of boundary layer in Poiseuille flow. We normalize pressure and time by inertial and viscous effect. The disturbances are taken to be periodic in the spanwise direction and time. We present a set of linear governing equations for the parabolic evolution of wavelike disturbances. Then, we derive modified Orr-Sommerfeld equations that can be applied in the layer. We find that Squire's theorem is applicable for the boundary layer. We find also that normalization by inertial or viscous effects leads to the same stability or instability. We find through the graphs that transition from stability to instability or the opposite can occur according to the Reynolds number and the wave number.

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