The hydrodynamic stability of laminar boundary layer flow along a horizontal plate with suction

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Abstract

Hydrodynamic stability and transition problems of two dimensional laminar external flow over a flat plate with wall suction are studied numerically using thetemporal linear stability theory. The flow is assumed similar two-dimensional laminar boundary-layer. The mean velocity profiles are obtained numerically for the case of suction. The stability problem formulation leads to the Orr–Sommerfeld equation. This equation is then resolved using the Chebyshev spectral collocation method. The neutral stability curves and the critical Reynolds numbers are presented.

Keywords: Boundary layer, Linear Stability, Suction, Collocation spectral method