

A family of laminar boundary layers along a semi-infinite flat plate

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A new similarity solution is obtained for flow of a uniform stream past an aligned, semi-infinite flat plate. The fluid is incompressible, of constant density, and constant absolute viscosity. A detailed examination is made of flows involving steady rates of accretion and of ablation at the leading edge. Both the classical Blasius boundary layer and the Rayleigh–Stokes shear layer are encompassed, each representing a different extreme case of the similarity solution. In contrast to the accretion case, only relatively small rates of ablation can be tolerated and there is a qualitative change in the boundary-layer solutions.

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