
Almost global existence for the Prandtl boundary layer equations

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Abstract

We consider the Prandtl boundary layer equations on the half plane, with initial datum that lies in a weighted Sobolev space with respect to the normal variable, and is real-analytic with respect to the tangential variable. The boundary trace of the horizontal Euler flow is taken to be a constant. We prove that if the Prandtl datum lies within ϵ of a stable profile, then the unique solution of the Cauchy problem can be extended at least up to time $T_\epsilon \geq \exp(\epsilon^{-1}/\log(\epsilon^{-1}))$.

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