

Analysis and Applied Mathematics Seminar

Euler equations on general planar domains

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Abstract: Bounded vorticity solutions to the 2D Euler equations on singular domains are typically not close to Lipschitz near boundary singularities, which makes their uniqueness a difficult open problem. I will present a general sufficient condition on the geometry of the domain that guarantees global uniqueness for all solutions initially constant near the boundary. This condition is only slightly more restrictive than exclusion of corners with angles greater than π and, in particular, is satisfied by all convex domains. Its proof is based on showing that fluid particle trajectories for general bounded vorticity solutions cannot reach the boundary in finite time. The condition also turns out to be sharp in the latter sense: there are domains that come arbitrarily close to satisfying it and on which particle trajectories can reach the boundary in finite time. The above results also extend to positive vorticity solutions on fairly irregular domains that may even contain corners with angles greater than π .

Monday, September 19 at 4:00 PM in 1227 SEO