



偏微分方程及其应用中心

学术报告

报告题目: The existence of Prandtl-Batchelor flows

报告人: 林治武教授, 复旦大学

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摘要: The existence of steady solutions of Navier-Stokes equations had been proved by Leray in 1930s. However, the inviscid limit of these steady solutions is still poorly understood. In particular, there is no general selection criteria to pick steady Euler flows as the inviscid limit. For steady two-dimensional incompressible flows with a single eddy (i.e., nested and closed streamlines), Prandtl (1905) and Batchelor (1956) proposed that in the limit of vanishing viscosity, the vorticity is constant in an inner region separated from the boundary layer. With Chen Gao, Mingwen Fei and Tao Tao, we give the first proof of the existence of Prandtl-Batchelor flows on a disk with the wall velocity slightly different from the rigid-rotation. For an annulus with wall velocities slightly different from the rigid-rotation and general forcing, we constructed generalized Prandtl-Batchelor flows with the leading Euler flow being the rotating shear flow uniquely determined by the tangential component of forcing. More recently, with Zhi Chen, Mingwen Fei and Jianfeng Zhao, we constructed Prandtl-Batchelor flows on a disk with a point vortex background.