

Seminar

Analytical solutions for von Kármán streets of hollow vortices in compressible flows

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Vortex streets are a common feature of fluid flows at high Reynolds numbers and their study is now well developed for incompressible fluids. Much less is known, however, about compressible vortex streets. Recently Crowdy & Green (2012) presented analytical solutions describing a class of steady incompressible von Karman vortex streets with distributed vorticity. To construct these they adopted the hollow vortex model where each vortex is modelled as a finite-area constant pressure region with non-zero circulation. For weakly compressible flows steady hollow vortex solutions are well known to be candidates for the leading order solution in a perturbative Rayleigh-Jansen expansion of a compressible flow. Here we give details of that expansion based on the vortex street solutions of Crowdy & Green (2012). Physical properties of the compressible vortex streets are described. Our approach uses the Imai-Lamla method coupled with analytic function theory and conformal mapping.

Friday, Feb 19th 2016

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS