

Abstract Submitted
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Multiscale analysis in perturbation dynamics for the two-dimensional wake SAU BAL — A three-dimensional initial-value problem to study the linear stability of the two-dimensional wake by means of a multi space and time scale description is presented. The viscous perturbation analysis is carried out so that, by imposing arbitrary three-dimensional perturbations in terms of the vorticity, both the early transient as well as the asymptotic behavior can be considered (Criminale & Drazin 1990, 2000). Analytical Navier-Stokes asymptotic expansions are used to describe the base flow. Non-parallel effects, as non linear convection and both streamwise and transversal diffusion, are directly included (Tordella & Belan 2003). After a Fourier decomposition in the $x - z$ plane, a complex and a real wavenumber in x and z directions are introduced, respectively (Scarsoglio, Tordella & Criminale 2007). The polar wavenumber is the small parameter of the regular perturbation scheme. The limit of small wavenumbers as well as the the more general problem with larger wavenumbers are studied and results are asymptotically compared with spatio-temporal normal mode analyses (Tordella, Scarsoglio & Belan 2006; Belan & Tordella 2006).

Sau Bal

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