**Linear response of a vortex column - singular eigenfunctions and growth mechanisms** ANUBHAB ROY, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, ABHISHEK S, Indian Institute of Technology, Madras, HARISH N. DIXIT, University of British Columbia, Vancouver, GANESH SUBRAMANIAN, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore — A vortex column supports oscillations known as Kelvin modes, eigenmodes that are irrotational outside the vortex core. In order to understand the interaction of a vortex with an external vortical disturbance field, we use an extended modal description that incorporates a singular continuous spectrum with eigenmodes that are vortical outside the core. The continuous spectrum eigenfunctions are explicitly evaluated for a Rankine vortex; the description is extended to smooth vorticity profiles based on an analogy with stratified shear flows. Next, in the framework of an initial value problem, we analyze the inviscid resonant interaction between a vortex column and suitably localized initial conditions. It is shown that while a Rankine vortex allows for an unbounded secular growth in response an infinitely localized initial condition, smooth vorticity profiles, with a non-zero critical layer vorticity gradient, exhibit a saturation resulting from a perturbation-vorticity-induced screening mechanism. The effects of an upstream tilt on this novel saturation response are investigated.

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