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Numerical approximation of spectrum of the linearized Navier-Stokes operator for flow around an infinite cylinder JONATHAN GUSTAFSSON, SIVAGURU S. SRITHARAN, Naval Postgraduate School — Numerical approximations of the spectrum of the Oseen operator and the linearized Navier-Stokes operator for flow around a cylinder in two dimensions have been studied for Reynolds numbers between 2 and 60. By approximating the eigenfunctions with a spectral method featuring basis functions covering the entire exterior domain, it is possible to obtain a numerical approximation to the continuous spectrum and the isolated eigenvalues (point spectrum). The numerical approximation of the spectra agrees with the previous rigorous results by Babenko (1982). That is a parabolic tongue containing the continuous spectra for the Oseen operator and a parabolic tongue containing the continuous spectrum plus a finite number of isolated eigenvalues for the linearized Navier–Stokes operator. The research feature a novel way of selecting location of collocation points. Future work will include control on the surface of the cylinder and examining its effect on both the unstable eigenvalues and the continuous spectrum.

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