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Biglobal stability analysis of spatially developing axisymmetric boundary layers VINOD NARAYANAN, RAMESH BHORANIYA, Indian Institute of Technology,Gandhinagar — Global stability analysis of incompressible axisymmetric boundary layers is performed. In the present analysis, we consider two geometries; axial flow over circular cylinders and circular cones. The Bi-global stability equations together with the boundary conditions form an eigenvalues problem and are solved using Arnoldi's algorithm. Chebyshev spectral collocation method is used for discretization of the stability equations. Spatial growth rate of disturbance waves at different Reynolds numbers and azimuthal wave numbers are computed. The results show that the disturbances have non-wave like behavior. The normalized spatial amplification in streamwise direction increases with increase in Reynolds number for axisymmetric mode. However, for non-axisymmetric modes it reduces with increase in Reynolds number. In case of flow over circular cone, stability analysis is performed for different cone angles, range of Reynolds numbers and different azimuthal wave numbers. The disturbances do not show wavelike behavior in this too. The flow is found to be spatially destabilizing in the case of circular cones at low Reynolds numbers. Thus the effect of transverse curvature here is destabilizing the flow. Detailed results will be presented at the time of conference.

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