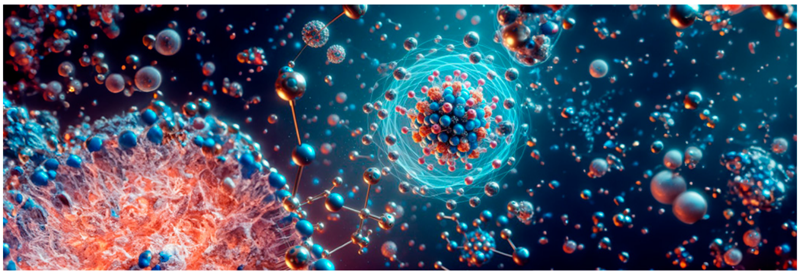

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Stability of approximate self-similar singular flows of axisymmetric Euler Equations

The evolution of an incompressible and inviscid fluid is determined by the Euler equations, which are nonlinear and nonlocal partial differential equations for the fluid velocity field. Although many properties and features of Euler equations are well known, it is not known if the velocity can or cannot develop a singularity in finite time in a three-dimensional space (3D). It is presented a procedure for obtaining approximate self-similar singular solutions of the 3D Euler equations with axial symmetry. Moreover, the majority of these solutions have the advantage of being stable concerning perturbations along the logarithmic time employed for a self-similar dynamical system. The stability eigenvalues and eigenfunctions related to the symmetries of the system are described, but they must be excluded from the stability spectrum of any solution. Since the approximate solutions have all remaining eigenvalues as negative, they are stable, and they would correspond to a physically possible singular flow. Thus, this provides more evidence that supports that Euler equations admit finite time singular solutions.

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