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Fourth-Order-Accurate Finite Difference Scheme with Non-uniform Grid in von Mises Coordinates

In this work, we develop and test a standard, five-point, fourth-order-accurate forward finite difference scheme for the boundary vorticity using uniform and non-uniform grids. The scheme is suitable for use when coordinate transformation is employed, and is tested in the computation of corner vorticity in the case of viscous fluid flow through a two-dimensional curvilinear channel that has been mapped onto a rectangular computational domain using von Mises coordinates.