Abstract Submitted
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A Method for Stable Computations in the Presence of Strong Vortices at Outflow Boundaries[1] SUCHUAN DONG, Purdue University — We present a robust and accurate outflow boundary condition and an associated numerical algorithm for incompressible flow simulations on severely-truncated unbounded physical domains. This outflow boundary condition allows for the influx of kinetic energy into the domain through the outflow boundaries, and prevents uncontrolled growth in the energy of the domain in such situations. The numerical algorithm for the outflow boundary condition is developed on top of a rotational velocity-correction type strategy to de-couple the pressure and velocity computations, and a special construction in the formulation prevents the numerical locking at the outflow boundaries. We show results for several flows with bounded or semi-bounded physical domains, and demonstrate that the presented method produces stable and accurate simulations on even severely truncated computational domains, where strong vortices are present at or exit the outflow boundaries.

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Suchuan Dong
Purdue University

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