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Pensacola, FL 32514. *A fast numerical solver for the unsteady Oseen problems in rotation form.*

We study the preconditioned iterative method for the unsteady Navier-Stokes equations. The rotation form of the Oseen system is considered. We apply an efficient preconditioner which is derived from the Hermitian/Skew-Hermitian preconditioner to the Krylov subspace iterative method. Numerical experiments show the robustness of the preconditioned iterative methods with respect to the mesh size, Reynolds numbers, time step and algorithm parameters. The preconditioner is efficient and easy to apply for the unsteady Oseen problems in rotation form. (Received September 23, 2011)