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A MULTIGRID SMOOTHER FOR HIGH REYNOLDS NUMBER FLOWS*

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Abstract. The linearized Navier–Stokes equations are solved in two space dimensions using a multigrid method where a semi-implicit Runge–Kutta scheme is the smoother. Explicit time-integration in the streamwise direction is combined with implicit integration in the body-normal direction. Thereby the stiffness of the equations due to the disparate scales in the boundary layer is removed. Reynolds number independent convergence is demonstrated in analysis as well as in numerical experiments.

Key words. Navier–Stokes equations, semi-implicit, multigrid, convergence acceleration.

AMS subject classifications. 65L06, 65M12, 76N20.

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