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ALADINS: AN ALGEBRAIC ADAPTIVE INCOMPRESSIBLE NAVIER-STOKES SOLVER

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Summary. In some applications of incompressible fluid dynamics, fast transients are present only in some periods of the overall time interval of interest. This is the case of blood flow problems, where the periodic action of the heart is split into two parts, called *systole* and *diastole* respectively. During systole, the heart contracts, the aortic valve is open and the blood is thrusted fastly into the arterial system. During diastole the aortic valve is closed and blood dynamics is essentially driven by vessel compliance. Another example concerns oil dynamics in vehicle brakes, which is induced by the action of the driver during a relatively small time interval. Presence of fast transients requires to use small time steps for solving the incompressible Navier-Stokes equations. A class of second and third order time-accurate splitting schemes has been introdced by Gervasio, Saleri and Veneziani, that features a hierarchical structure prone to the definition of an effective time-error estimator. The latter can be used for reducing computational costs in a time-adaptive framework. In this talk we present some technical details of this time adaptive scheme based on Algebraic Splitting called "ALADINS" (ALgebraic ADaptive Incompressible Navier-Stokes). We will discuss some implementation issues and present numerical results in 2D and 3D.