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The Karman Vortex Street behind a Moving Rectangular Cylinder MARIO SANCHEZ SANZ, BELEN FERNANDEZ, ANGEL VELÁZQUEZ, Universidad Politecnica de Madrid — This work studies the flow around a square cylinder at a relatively large Reynold number $Re = \rho U_\infty h/\mu \sim 200$, where ρ, U_∞, h and μ represent the inlet flow density and average velocity, cylinder height and flow viscosity respectively. For this value of Re, the flow develops the well known von Karman vortex street causing the cylinder to experience unsteady lift and drag forces that will induce an oscillatory movement in the cylinder. To model the interaction between the fluid and the solid, we assume a damped coupling with the damping parameter A chosen to give the biggest oscillation amplitude. The motion of the rigid body is therefore governed by the equation $md^2y_c/dt^2 + Ady_c/dt = C_l/2$ where m is the solid-to-fluid density ratio, C_l is the time-dependent lift coeficient and y_c is the position of the solid. The movement of the cylinder changes dramatically the dynamics of the flow, driving to the modification of the vortex shedding frequency and to pressure drops much higher than those provoked by a steady cylinder. In the present work we study the shedding frequency and the pressure drop variation with the aspect ratio of the solid δ and with m by integrating numerically the two dimensional Navier-Stokes equations of a constant density fluid in a square chanel with blockage ratio $H/h = 2.5$, where H and h represents the channel and the cylinder heights respectively.

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