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The effect of opening angle and Reynolds number in a planar asymmetric diffuser studied using LES ASTRID HERBST, DAN HENNINGSON, KTH Mechanics — The performance of diffuser-like flows occuring in many technical applications is strongly affected by separation and therefore flow control is needed. Here we study flow separation in a plane asymmetric diffuser by the means of LES. The numerical implementation follows the work by Kaltenbach et.al. using the code developed at CTR, Stanford. The incompressible Navier–Stokes equations are solved on a structured grid using a hybrid second order finite difference / spectral method with a dynamic subgrid model. Simulations have been conducted for two opening angles of 8.5° and 10° at the Reynolds number $Re_b = 9000$ and at $Re_b = 2000$ a simulation for an opening angle of 8.5° matching the experimental configuration of Gullman-Strand et al. has been performed. We have found an increase in the separated region with increasing Reynolds number as well as for a wider opening angle. Future simulations of periodic forcing of the separated flow in the plane asymmetric diffuser will be presented at the conference. Gullman-Strand J. et al., Int. J. Heat and Fluid Flow, 25,pp. 451-460 (2004). Kaltenbach H. J. et. al, JFM, 390, pp. 151-185 (1999)

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