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**Boundary layer flow on a long thin rotating cylinder.** MIGUEL A. HERRADA, University of Seville (Spain), CARLOS DEL PINO, RAMON FERNANDEZ-FERIA, University of Malaga (Spain) — The development and stability of the boundary layer flow over a long thin cylinder aligned with the main flow and which rotates around its axis is considered. Numerical results show that the introduction of rotation has an important effect on the behavior of the basic flow. When the swirl increases, the shear stress at the wall also increases due to the changes in the pressure distribution along the cylinder surface. A nonparallel linear stability analysis of the basic flow is also performed using Parabolized Stability Equations (PSE). Even at moderately low rotation, we have found the existence of unstable centrifugal modes, in addition to the shear ones found in previous stability analysis of the boundary layer flow on a cylinder with no rotation. These centrifugal instabilities develop at Reynolds numbers much lower than those required for the growing of the shear instabilities. Our analysis shows that non parallel effects play a key role in the development of these instabilities, being the mode with azimuthal wave number $n = 1$ the most unstable one.

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