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Stability effects of a base cavity on the wake of axisymmetric bluff bodies[1] ENRIQUE SANMIGUEL-ROJAS, PATRICIO BOHORQUEZ, JOSÉ IGNACIO JIMÉNEZ-GONZÁLEZ, CARLOS MARTÍNEZ-BAZÁN, University of Jaen (Spain) — We extend our previous research on the instability properties of the laminar incompressible flow around a cylindrical body with a rounded nose and length-to-diameter ratio $L/D = 2$, at zero angle of attack, by analyzing the effects of a cylindrical base cavity of length h and diameter D_c. We combine experiments, three-dimensional direct numerical simulations and a global linear stability analysis. The direct numerical simulations and the global stability results accurately predict the stabilizing effect of the cavity on the stationary, three-dimensional bifurcation in the wake as h/D increases. In fact, it is shown that, for a given value of D_c/D, the critical Reynolds number for the steady bifurcation, Re_{cs}, increases monotonically as h/D increases, reaching an asymptotic value, that depends on D_c/D, at $h/D \approx 0.7$. On the other hand, for a fixed value of h/D, Re_{cs} exhibits a maximum at $D_c/D \approx 0.8$. Similar behavior has been observed experimentally and numerically for the second, oscillatory bifurcation, and its associated critical Reynolds number, Re_{co}.

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