Drag reduction using a multi-cavity at the afterbody\textsuperscript{1} ENRIQUE SANMIGUEL-ROJAS, Universidad de Córdoba, Spain, ANTONIO MARTÍN-ALCÁNTARA, CÁNDIDO GUTIÉRREZ-MONTES, CARLOS MARTÍNEZ-BAZÁN, Universidad de Jaén, Spain, MANUEL A. BURGOS, Universidad Politécnica de Cartagena, Spain, MANUEL HIDALGO-MARTÍNEZ, Universidad de Córdoba, Spain — We present a numerical study on the drag reduction of a two-dimensional bluff body with a blunt trailing edge, which has a chord length $L$, body height $H$ and spanwise width $W$, being $H/W \ll 1$, aligned with a turbulent incompressible free-stream of velocity $U_\infty$, density $\rho$ and viscosity $\mu$. In particular, an extensive parametric study is performed numerically using the IDDES turbulent model, at a Reynolds number, $Re = \rho U_\infty H/\mu = 20000$, to analyze the effect on the drag coefficient $C_D$ of both a single-cavity as a multi-cavity of variable depth $h$ at the base of the body. It is observed within the range, $0 \leq h/H \leq 0.2$, that $C_D$ decreases monotonically reaching an asymptotic value in both cases. In turn, shorter cavity depths are necessary to reach the same drag reduction with a multi-cavity than with a single-cavity. On the other hand, the temporal evolution of the drag coefficient shows a lower standard deviation with a multi-cavity than with a single-cavity, which is manifested in the flow as a wake with a lower level of disorder.

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