

DEVELOPMENT-LENGTH REQUIREMENTS IN PLANAR CHANNEL FLOWS OF A FLUID OBEYING THE SISO MODEL

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This work presents a numerical study regarding the required development length ($\mathcal{L} = L/H$) to reach fully-developed flow conditions at the entrance of a planar channel for Inelastic non-Newtonian fluids modeled by the Sisko model. The simulations were carried out for low Reynolds number flows in the range $0 < Re \leq 100$, for a power, n , in the range $1/3 \leq n \leq 2$ and for a dimensionless infinite viscosity, $\bar{\mu}_\infty$, varying in the range $0 \leq \bar{\mu}_\infty \leq 0.1$. A new non-linear relationship between \mathcal{L} and Re was derived, taking into account the different values of n and $\bar{\mu}_\infty$. Also, new exact solutions are presented for the velocity profile under fully developed flow conditions (for specific values of n).

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