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Numerical Analysis on the Kinematic Reversal Conditions of Non-isothermal Flows in Single-Screw Extruders

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When describing the flow in single-screw machines in mathematical terms, the screw is generally assumed to be standing still inside a rotating barrel. This study looks into whether and, if so, how far this principle of kinematic reversal falsifies the calculation result. For this purpose both analytical investigations and comparative FEA simulations have been performed, taking the general case of a nonisothermal, non-fully developed flow in a flat channel. It is shown that both kinematic boundary conditions lead to absolutely identical calculation results.