Numerical Modelling of Newtonian Fluids in Bypass Tube

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Abstract

Previous work was concentrated on numerical solution of viscous and viscoelastic fluids flow in the branching channel. Used mathematical models were Newtonian and Oldroyd-B models. Both models were generalized by cross model in the shear- thinning meaning. The aim of this work is to describe and discuss the results of numerical study of Newtonian fluids in the bypass tube. The different constriction in tha main tube were tested. In this work a Newtonian mathematical model was used for an investigation of bypass flow. The fundamental system of equations is the system of generalized Navier-Stokes eqautions for incompressi ble laminar flow. The numerical solution is based on central finite volume method using explicit Runge-Kutta time integration. Numerical simulations on three dimensional geometries are performed for our study. Considered geometry is based on 3D hexahedral structured mesh in bypass tube with different diameter of stenosis (a narrowing of blood vessel). Future work will be to direct this simulation at extension to shear thinning fluids for numerical modelling of blood flow.

References

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