

Numerical Solution of Newtonian Flow in Bypass and Non-Newtonian Flow in Branching Channels

Radka Keslerová, Karel Kozel, Vladimír Prokop
Czech Technical University, Faculty of Mechanical Engineering,
Department of Technical Mathematics

Abstract

This paper deals with a problem of numerical solution of laminar Newtonian viscous incompressible flows through a channel with angular bypass and non-Newtonian flows in branching channels. One can describe these problems using model of the incompressible Navier-Stokes equations. In the case of non-Newtonian flow the viscosity in the model is prescribed by specific formula. The system of the Navier-Stokes equations is solved using artificial compressibility method. The finite volume method in cell centered formulation is used for the spatial discretization. The time integration is realized by the explicit second order Runge-Kutta method. The results of this problem could be used in the field of the cardiovascular research. In the end some numerical results of mentioned problems are presented.