Analysis of Shear-rate Dependent Blood-Flow Models Through Idealized Bifurcating Geometries with Traction-Free and Resistance Outlet Boundary Conditions

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Abstract

Arterial blood-flow is simulated using the shear-rate dependent Carreau-Yasuda fluid model through idealized bifurcating arterial geometries. Given that the whole cardiovascular system would be too large and complex to model, a resistance boundary condition is used to incorporate the downstream domains in a truncated geometry. The pressure and flow-rate of a truncated geometry with resistance outlet boundary conditions are compared to the pressure and flow-rate at the same region of a non-truncated geometry with traction-free outlet boundary conditions.