## The application of the GSM-CFD solver for the blood flow in carotid

## bifurcations

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## Abstract

The blood flow of carotid bifurcation is simulated by the GSM-CFD solver, which is based on the gradient smoothing method (GSM). The GSM is proven to be robust and has second-order accuracy, even on highly distorted meshes. In GSM-CFD solver, smoothing operations of spatial derivatives replace the interpolations in the governing equations. The blood flow of carotid bifurcations is modeled as Carreau-Yassuda fluids and the vessel is regarded as rigid in this study. A few examples are presented to show the robustness and accuracy of the proposed GSM-CFD solver. A detailed comparative study of the the power index in Carreau-Yasuda is carried out and the results of the streamline and velocity contours reveal the strong dependence on the power index.

Keywords: GSM, Non-Newtonian fluids, Carreau-Yassuda model, Carotid bifurcation.