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FSI ANALYSIS OF BLOOD FLOW IN THE AORTA AND ITS RELATIONSHIP TO THE GEOMETRICAL CHARACTERISTICS

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We present a fluid–structure interaction (FSI) analysis of blood flow in the thoracic aorta as it relates to aortic aneurysms. Thoracic aortic aneurysm is one of the life-threatening diseases. However, natural history of the development of an aneurysm has not been fully understood. There are many parameters characterizing the blood flow, such as geometric, kinematic and physiologic parameters. The information on which parameter would be the most important one in predicting the generation and development of the aneurysms will be useful in clinical medicine. In this study, we draw attention to the geometrical characteristics of the blood vessels. Differences in the geometry of the vessels bring about differences in the flow characteristics, which lead to different wall shear stresses (WSS) and oscillatory shear index (OSI) distributions. We consider a number of patient-specific aorta models constructed from CT scans. We compute the flow field with the variational multiscale version of the Deforming-Spatial-Domain/Stabilized Space–Time method (DSD/SST-VMST) [1, 2].

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