

# On Two Modeling Issues in Aortic Blood Flow Simulations

Volker John

Weierstrass Institute for Applied Analysis and Stochastics (WIAS),  
Mohrenstr. 39, 10117 Berlin, Germany  
Freie Universität Berlin, Department of Mathematics and Computer Science,  
Arnimallee 6, 14195 Berlin, Germany  
john@wias-berlin.de

This talk discusses two questions arising in the numerical simulation of aortic blood flows. These flows have a turbulent character and thus the use of a turbulence model becomes necessary for their numerical simulation. The talk starts with an introduction to turbulence modeling for incompressible flows. For aortic blood flows, the influence of the turbulence models on the prediction of clinically relevant biomarkers, which are used to assess the degree of severity of the pathological condition (pressure difference, secondary flow degree, normalized flow displacement, wall shear stress), is discussed in detail. It will be shown that the impact of the used turbulence model on the prediction might be considerable. The second question that is addressed is the choice of the viscosity model: Newtonian vs. several non-Newtonian models. Also here the impact on the biomarkers is monitored. It turns out that the results obtained with the different viscosity models are very similar.

This talk presents joint work with colleagues from WIAS Berlin and from Charité Berlin.

## References

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- [2] S. Katz, A. Caiazzo, V. John, Impact of viscosity modeling on the simulation of aortic blood flow, *J. Comp. Math. Appl.* 425, Article 115036, 2023 doi:10.1016/j.cam.2022.115036.