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DISSIPATIVE PARTICLE DYNAMICS (DPD) METHODS FOR BIOLOGICAL FLOWS

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We are interested in modeling hematologic disorders such as malaria or sickle cell anemia, where the modification of the viscoelastic properties and shapes of red blood cells (RBCs) are two of the most dominant features of the disease. We have developed multiscale models of RBCs of different fidelity [1,2], e.g. single-component or two-component models to represent the cytoskeleton-lipid bilayer separately, that we use in quantifying the blood rheology and also in probing possible vaso-occlusions in arteriolar flows. In this talk, the main numerical advances of the DPD method and its extensions are summarized and an analysis of the methods using the Mori-Zwanzig formulation is presented. Subsequently, representative results for the aforementioned pathologies are presented.

References

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