Abstract Submitted
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A symplectic integration algorithm for red blood cells[1] ULF D. SCHILLER, University of Florida — Blood is a complex biofluid that shows interesting non-Newtonian and viscoelastic behavior. Red blood cells are of particular relevance for blood rheology and dynamics because they can undergo shape transformations when subjected to shear flow as it occurs in small blood vessels. The equilibrium shape of red blood cells is a biconcave discocyte which is a result of the competing elastic energies. While in some previous works, this shape was explicitly built into the model, we here aim at a model that reproduces the discocyte as the minimizing shape with respect to the elastic constitutive laws. The computational model we propose describes the red blood cells as an elastic membrane. We have implemented a symplectic integration algorithm that preserves the Hamiltonian structure. This algorithm leads to highly accurate energy conservation and consequently superior stability. Our model reproduces the experimentally observed cell shapes.

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