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Non-equilibrium Dynamics of Initially Spherical Vesicles in Shear Flows[1] AFSOUN RAHNAMA FALAVARJANI, DAVID SALAC, University at Buffalo — Many vesicles have a spherical resting shape and exposure to shear flows induces an exchange between the suboptical/thermal fluctuations and system deformation, with the total area being conserved. Here, the dynamics of such vesicles is numerically explored. Unlike other models, we do not begin with a deflated vesicle. By taking into account the membrane fluctuations, our model allows for an increase in the apparent area of the vesicle which introduces an isotropic tension force on the membrane which grows exponentially with the change in the area in low tension regime. Our results, such as the viscosity-dependence of the tank-treading, breathing/trembling, and tumbling regimes, are in good quantitative agreement with experimental observations.

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David Salac
University at Buffalo

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