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Modeling flow for modified concentric cylinder rheometer geometry KAREN EKERUCHE, KELLY CONNELLY, H. PIROUZ KAVEHPOUR, University of California Los Angeles — Rheology experiments on biological fluids can be difficult when samples are limited in volume, sensitive to degradation, and delicate to extract from tissues. A probe-like geometry has been developed to perform shear creep experiments on biological fluids and to use the creep response to characterize fluid material properties. This probe geometry is a modified concentric cylinder setup, where the gap is large and we assume the inner cylinder rotates in an infinite fluid. To validate this assumption we perform shear creep tests with the designed probe on Newtonian and non-Newtonian fluids and vary the outer cylinder container diameter. We have also created a numerical model based on the probe geometry setup to compare with experimental results at different outer cylinder diameters. A creep test is modeled by applying rotation to the inner cylinder and solving for the deformation of the fluid throughout the gap. Steady state viscosity values are calculated from creep compliance curves and compared between experimental and numerical results.

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