Simplified models of high-aspect-ratio ellipsoids under shear
FENG SHI, PETER J. MUCHA, UNC-Chapel Hill — Inspired by rheoscopic flow visualization, we extend the classic study of the motion of small ellipsoidal particles under shear, focusing on simplifications obtained by consideration of the extreme aspect ratios typical of rheoscopic particles (e.g., Kalliroscope). In particular, the long-time behavior of scalene (triaxial) elllipsoids can in some cases be well-approximated by a low-order model in the appropriate aspect ratios. We enumerate and describe the generic long-time motions of such particles in the lowest-order model. We then investigate changes induced by inclusion of the physically-appropriate first-order correction, with particular attention to a periodic wobbling motion special to scalene (cf. axisymmetric) ellipsoids.

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