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Drag coefficient for sedimentating-rotating spherical particles in a viscoelastic fluid ALFONSO CASTILLO, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — The sedimentation of a single sphere in a viscous fluid is a classical problem in fluid mechanics. Despite its apparent simplicity, the problem is full of delicate intricacies. In particular, for the case of viscoelastic fluids, the subject is still not fully resolved: it is unclear whether the drag should increase of decrease (with respect to the Newtonian case) for large values of the Weissemberg number. We study this problem with a twist, literally. To extend the range of shear rates attained for a given fluid-sphere combination we make it rotate, with an external magnetic field, as it sediments. We therefore can significantly extend the range of Weissenberg numbers to well above 1. We use a Newtonian reference fluid, a Boger-type fluid and spheres of different sizes and weights. The drag coefficient, and drag correction factor are calculated for all cases. Our non-rotating results are in good agreement with those by Jones et al., 1994. We observe that for rotating-sedimenting spheres the drag is always larger than in the Newtonian case.

Roberto Zenit
Universidad Nacional Autonoma de Mexico

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