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Slow motion and deformation of a viscoplastic drop in a viscous fluid[1] OLGA LAVRENTEVA, IRINA SMAGIN, AVINOAM NIR, Chemical Engineering Dept,. Technion — The slow sedimentation of a deformable viscoplastic drop in a Newtonian fluid is studied making use of a variation of integral equation method. The Green function for the Stokes equation is used and the non-Newtonian stress is treated as a source term. The computations carried out for a range of physical parameters of the system revealed that increasing in the yield stress magnitude (the Bingham number, Bn) stabilizes both oblate and prolate drops. This is in contrast to the effect of the viscosity of Newtonian drop that is known to destabilize oblate drops. This strong stabilization effect can be explained by the presence of unyielded zones inside falling drops. An interesting observation is that the growth of the limiting viscosity of the Bingham fluid destabilize oblate deformations at low Bn and have stabilizing effect at higher Bn.

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