# Non-homogeneous flow of a thixotropic model fluid in a complex geometry

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The non-homogeneous flow of a thixotropic fluid in a complicated geometry is explored. Flow around a settling sphere in the thixotropic fluid described by Moore model is considered as a model problem. The conservation equations of mass and momentum that is coupled with the structure-kinetics equation is solved using Discontinuous Galerkin method. Depending on Weissenberg number (Wi), the flow solutions are divided into three different regimes, which is attributed to a complex interplay of three competing factors: Brownian structure recovery, shear-induced structure breakdown, and refilling effect by convection. For small Wi, where the Brownian structure recovery is predominant, thixotropic effect is negligible and the flow solution is not too dissimilar to that of Newtonian flow. As Wi increases, flow solution deviates from Newtonian behavior and remarkable structural gradient is observed. In this regime, flow profile is determined by balance of all three factors. At large enough Wi, where the Brownian structure recovery is negligible, the combination of shear-induced structure breakdown and refilling effect by convection plays a decisive role in determining flow profile.