Pendant drop formation of shear thinning and yield stress fluids

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The growth and detatchment of drops from a nozzle is important in many industrial applications (e.g. ink-jet printing, biological assays) and is a familiar occurrence in everyday life (e.g. a dripping tap). For drop formation at low flow rates from a nozzle under the influence of gravity, the pendant drop grows slowly at first with drop shape determined by a quasi-static balance between gravity and interfacial tension. When the drop reaches a critical volume, the force balance is lost followed by a rapis development of necking and pinch-off of the pendant drop. In many practical cases such as biological fluids or fine suspensions the drop fluid can be non-Newtonian and may exhibit for example visco-elastic, shear thinning, or yield stress behaviour, or some combination of these. This talk will detail recent developments in the numerical modelling for shear thinning and yield stress fluids using a volume of fluid method.