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Title: Multichain vs single chain models for entangled dynamics: a case study.

Abstract: There has been immense effort over the years towards a microscopic understanding of bulk, especially rheological, phenomena in polymeric systems. Both multichain (molecular dynamics, etc.) and single chain (tube, slip links, etc.) models have been of value in this regard. Our current efforts have been focused on forging a link between the two classes of models and especially, using the multichain models to establish the foundations of the single chain models. In this talk, I will focus on two related issues. I will first discuss our current approach towards a multiscale understanding of entangled dynamics and provide a generous introduction to some of the models used for this purpose. I will then illustrate how a particular model, the recently introduced slip-spring model, can be used to establish the link between molecular dynamics simulations and the tube model. To this end, I will present a detailed comparison between molecular dynamics simulations and the slip-spring model. I will close with a summary of what we have learned thus far and hint at avenues for further exploration.