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Scaling laws for polymer chains using mesoscopic simulations

VASILEIOS SYMEONIDIS, Division of Applied Mathematics, Brown University, BRUCE CASWELL, Division of Engineering, Brown University, GEORGE KARNIADAKIS, Division of Applied Mathematics, Brown University — Several types of bead-spring representations of chains are used to model simulations of dilute polymer solutions by dissipative particle dynamics (DPD). The static exponent scaling law is used to detect the prevalence of phantom collisions. For the models used, values range between 1/2 and 3/5, the Flory value for self-avoiding walks. Chain behavior under steady shear shows no similar scaling law, but different stretching response for finitely and infinitely extensible springs. The effect of temperature is also investigated for a chain of five, ten and twenty monomers.

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