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Asymptotic expansion of a singular potential near the nematic-isotropic phase transition point in the Landau-de Gennes theory

The Landau-de Gennes theory is a type of continuum theory that describes nematic liquid crystal configurations in the framework of the Q-tensor order parameter. In the free energy, there is a singular bulk potential which is considered as a natural enforcement of a physical constraint on the eigenvalues of symmetric, traceless Q-tensors. In this talk we shall discuss some analytic properties related to this singular potential. More specifically, we study the asymptotic expansion of this singular potential (up to fourth order) near the nematic-isotropic phase transition point.