Capillary waves in nematic liquid crystal

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The problem of short harmonic capillary waves propagation with small amplitude in incompressible nematic liquid crystal is considered. The case of Frank-Oseen approximation was studied. This calculation assumed the isotropic viscose tensor, i.e. independent of the equation of the director and the velocity. In this case director and velocity are related due to the anisotropic surface tension.

For this model the problem of surface gravitational waves propagation for nematic layer under the viscous incompressible isotropic fluid one with Rapini model for surface tension is solved. The dispersion relation is received. Diagrams of circular frequency and damping factor as function of the wave number are presented using the parametric calculus and numerical method. Also the stability of this wave is studied. It is shown that stability is depended from the divergent member coefficient in the Frank-Oseen free energy expression.