

Nematodynamics models

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Eliminating dissipation in the study of the dynamics of liquid crystals, yields conservative equations of motion. The geometric structure of these equations is described for both for the Ericksen-Leslie director and the Eringen micromorphic theories.

This geometric insight leads to the solution of a 25 year old controversy in the engineering community, establishing a precise relationship between these models, based on the theory of Euler-Poincaré equations on semidirect products with cocycles. This leads to new equations of motion, equivalent to the original ones, which are appropriate for the proof of well posedness of the full dissipative equations in both 2 and 3 dimensions.

Time permitting, these results will also be presented.