Mathematics > Analysis of PDEs

On the long-time behavior of some mathematical models for nematic liquid crystals

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A model describing the evolution of a liquid crystal substance in the nematic phase is investigated in terms of two basic state variables: the {\it velocity field} $\bu$ and the {\it director field} $\di$, representing the preferred orientation of molecules in a neighborhood of any point in a reference domain. After recalling a known existence result, we investigate the long-time behavior of weak solutions. In particular, we show that any solution trajectory admits a non-empty ω-limit set containing only stationary solutions. Moreover, we give a number of sufficient conditions in order that the ω-limit set contains a single point. Our approach improves and generalizes existing results on the same problem.

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