Cornell University Library

We gratefully acknowledge support from the Simons Foundation and member institutions

arXiv.org > math > arXiv:1107.3947

Search or Article-id (Help | Advanced search)

All papers Go!

Mathematics > Analysis of PDEs

On a 3D isothermal model for nematic liquid crystals accounting for stretching terms

Cecilia Cavaterra, Elisabetta Rocca

(Submitted on 20 Jul 2011 (v1), last revised 17 Apr 2012 (this version, v2))

The present contribution investigates the well-posedness of a PDE system describing the evolution of a nematic liquid crystal flow under kinematic transports for molecules of different shapes. More in particular, the evolution of the {\em velocity field} $\ub$ is ruled by the Navier-Stokes incompressible system with a stress tensor exhibiting a special coupling between the transport and the induced terms. The dynamic of the {\em director field} $\bd$ is described by a variation of a parabolic Ginzburg-Landau equation with a suitable penalization of the physical constraint $|\bd|=1$. Such equation accounts for both the kinematic transport by the flow field and the internal relaxation due to the elastic energy. The main aim of this contribution is to overcome the lack of a maximum principle for the director equation and prove (without any restriction on the data and on the physical constants of the problem) the existence of global in time weak solutions under physically meaningful boundary conditions on $\bd$ and $\ub$.

Subjects: **Analysis of PDEs (math.AP)**

Cite as: **arXiv:1107.3947 [math.AP]**

(or **arXiv:1107.3947v2 [math.AP]** for this version)

Submission history

From: Elisabetta Rocca [view email]

[v1] Wed, 20 Jul 2011 11:48:17 GMT (17kb)

[v2] Tue, 17 Apr 2012 12:46:12 GMT (20kb)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

Download:

- PDF
- PostScript
- Other formats

Current browse context:

math.AP

< prev | next >

new | recent | 1107

Change to browse by:

math

References & Citations

- NASA ADS

Bookmark(what is this?)