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Dedicated to Professor LAZĂR DRAGOŞ on his 75^{th} birthday

Stability and Bifurcations in the Electroconvection of Nematic Liquid Crystals

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Abstract - Electroconvection in nematic liquid crystals is a paradigm for pattern formation in anisotropic systems, exhibiting a complex spatiotemporal dynamical structure. We present here the result of a bifurcation study of the motion of a planar layer of nematic liquid crystals subjected to a transverse electric field. The linear stability problem is solved analytically for the velocity and electric potential. Ginzburg Landau type amplitude equations are then used for the weakly nonlinear analysis near threshold. A rich variety of patterns, like travelling waves and rectangles, standing rectangles and rolls, alternating waves and more complex spatiotemporal structures, is predicted at Hopf bifurcation. Eckhaus instability boundaries for these patterns are determined, too.

Key words and phrases : Ginzburg Landau equations,travelling waves, Eckhaus instability boundaries, anisotropic fluid.

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