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Alternating Waves in Electroconvection of Nematic Liquid Crystals GYANU ACHARYA, J.T. GLEESON, Department of Physics, Kent State University, Kent, OH 44242, USA , JOSHUA LADD, GERHARD DANGELMAYR, JULIANA OPREA, Department of Mathematics, Colorado State University, Fort Collins, CO 80523, USA — We present the results of pattern formation in electroconvection of liquid crystal 4-ethyl-2-fluoro-4′-[2-(trans-4-pentylclohexyl)-ethyl]biphenyl (I52) with planar alignment. The pattern was a function of three control parameters: applied ac voltage, driving frequency and electrical conductivity. Over certain range of conductivity, the initial transition (supercritical Hopf bifurcation) leads to right and left traveling zig and zag rolls .Time evolution of spatial Fourier transform (FT) of a series of these images with the sampling rate greater than Hopf frequency and taken under same controlled parameters were studied. To demodulate zig/zag rolls, the region around $\mathbf{k}_n$(the wave vector of a given mode) of interest at one quarter of the FT was taken setting remainder of the FTs to zero. Taking the index of the maximum FT value at that region as the reference point, again this region was separated into four parts and redistributed at four corners. The absolute value of the inverse FT of the modified function gives the required envelope. The temporal variation of the amplitudes of these envelopes is periodic between standing zig and zag modes which are consistent with the theoretical predictions*. Supported by NSF-DMS0407418.
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