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On the strong solutions to the 2D stochastic Ericksen-Leslie system: A Ginzburg-Landau approximation approach

We consider a nonlinear and constrained stochastic PDEs modelling the dynamics of 2-dimensional nematic liquid crystals under random perturbation. This system is coupling of the Navier-Stokes and the Heat Flow of Harmonic maps and is known as the stochastic Ericksen-Leslie equations (SELEs). We discuss the existence of local strong solution to the stochastic Ericksen-Leslie equations. In particular, we study the convergence of the stochastic Ginzburg-Landau approximation of SELEs, and prove that the SELEs with initial data in $H^1 \times H^2$ has at least a martingale, local solution which is strong in PDEs sense.

This is a joint work with Z. Brzeźniak and G. Deugoué.