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The complex Ginzburg-Landau equation perturbed by a force localised both in physical and Fourier spaces

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Abstract. In the paper [20], a criterion for exponential mixing is established for a class of random dynamical systems. In that paper, the criterion is applied to PDEs perturbed by a noise localised in the Fourier space. In the present paper, we show that, in the case of the complex Ginzburg-Landau (CGL) equation, that criterion can be used to consider even more degenerate noise that is localised both in physical and Fourier spaces. This is achieved by checking that the linearised equation is almost surely approximately controllable. We also study the problem of controllability of the nonlinear CGL equation. Using Agrachev-Sarychev type arguments, we prove an approximate controllability property in the case of a control force which is again localised in physical and Fourier spaces.

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