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On the controllabilty of nonlinear Schrödinger equations

We consider the controllabilty of nonlinear Schrödinger equations in two specific cases, namely the nonlinear Hartree equation (of quantum chemistry), and the Gross–Pitaevskii equation (in the theory of Bose–Einstein condensation). We study the mathematical structure of the sets of reachable and nonreachable states, and show, *e.g.*, that the set of nonreachable states for the Hartree equation is "fat" in the Baire categorical sense, and dense in state space, whereas the set of reachable states is "meagre". In the Gross–Pitaevskii case the nonreachable states form a finite dimensional manifold.

Joint work with Reinhard Illner, Victoria, and Holger Teismann, Acadia.