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Title: Small-time controllability of nonlinear parabolic evolution equations with bilinear controls

Abstract: This talk addresses the small-time controllability properties of a class of nonlinear parabolic evolution equations defined on a torus of arbitrary dimension and governed by bilinear controls. Under a suitable saturation condition on the potential terms, we establish small-time approximate controllability between states with the same sign. In the one-dimensional case, this result can be further enhanced by combining it with a local exact controllability property. This strategy allows us to prove small-time exact controllability from any positive initial state to the ground state associated with the evolution operator.