

Title: Existence of unattainable states for the Schrödinger type flows

Abstract: I will first introduce the notion of controllability for differential equations in certain senses starting with the finite dimensional case. Then, I will move to distributed parameter systems (PDEs) and I will contrast the two cases. Using an integral transform method, I will give an elementary proof of the existence of physically reasonable states to which the heat flow cannot be steered. I will show that the same technique fails for dispersive equations which will motivate us to consider the latter problem with rather more technical tools. These include recent developments in well-posedness theory of initial-/boundary value problems as well as control theoretical techniques such as the Hilbert Uniqueness Method. We will perform this with the canonical example of the classical Schrödinger equation and also extend the same results to biharmonic problems.