1077-49-680      **Ruixing Long\*** (`rlong@princeton.edu`). *Gradient flow in quantum control problems and the role of singular controls.*

Due to the lack of direct motion planning algorithms, the task of steering a quantum system from one state to another is often achieved by optimizing a suitable objective function in the control space. A commonly used optimization procedure in the quantum control community is the gradient flow. In order to explain the wide success of this procedure in numerical simulations, we propose to analyze the asymptotic behavior of the corresponding continuous dynamical system in the control space. Understanding the role of a specal class of controls called singular controls is of critical importance in this analysis. We will present some recent results in that direction. (Received September 09, 2011)