Some Mathematical and Numerical Questions Arising in the Control of Quantum Systems

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Abstract.
   We shall overview some issues related to the mathematical analysis and the numerical analysis of the simulations used in the control of the evolution of quantum systems. From the theoretical standpoint, questions such as exact controllability or existence of an optimal control in such a setting will be addressed. On the numerical side, questions related to the computations of gradients of the cost function, or to the convergence of the optimization algorithms will be examined. Open questions and tracks for further research will be pointed out.