Controllability of Quantum Systems—Theoretical and Constructive

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Abstract. The presentation will first survey what is known about the controllability of closed quantum systems. Next, the usage of the intervening Lie theoretic criteria to produce explicit schemes for the control of such systems will be presented. Time permitting finite dimensional models which do not evolve on the unitary groups will be discussed. Time permitting, one example of reachable set determination for an uncontrollable system and some connections of the intervening analysis to issues of interest in quantum information theory will be discussed. Specifically, the dynamical Lie algebra of this uncontrollable system will be shown to be explicitly conjugate to the Lie algebra of local operators of a two "qubit" system, and this leads to interesting (in the view of the speaker) points for both topics.