1077-93-37 **Thomas Chambrion*** (thomas.chambrion@iecn.u-nancy.fr), Institut de Mathématiques Elie Cartan, B.P. 239, 54506 Vandoeuvre, France. *Weakly coupled bilinear quantum systems.*

In the absence of decoherence, the dynamics of a controlled quantum system is given by a Schrödinger equation, $x' = Ax + u(t)Bx$, where x lies in some infinite dimensional Hilbert space, A is a skew-adjoint operator, B is a skew-symmetric linear operator accounting for the interaction of the environment with the system (e.g., trough a laser) and u is the time variable scalar intensity of the control. We will restrict ourselves to the case where A has a purely discrete spectrum. The energy of the system is the $A^{1/2}$ norm of x.

A bilinear system is *weakly coupled* if $|\Im\langle Ax, Bx\rangle| \leq |\langle Ax, x\rangle|$ for every x. Most of the physical examples have this feature. For weakly-coupled bilinear systems, there exists an a priori bound for the growth of energy of the system in terms of the L^1 norm of the control u. In particular, such systems can be approximated with arbitrary precision by their finite dimensional Galerkyn approximations. This gives a theoretical justification of the approximations usually done in practice and provides constructive control algorithms.

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