Aitor Balmaseda Martín

Universidad Carlos III de Madrid

Quantum evolution and sesquilinear forms: stability and control

The evolution of Quantum Systems is given by the Schrödinger equation, which is a first order linear ODE in defined on a complex, separable Hilbert space. However, in the most general case this Hilbert space is infinite-dimensional and the linear operator, $H(t)$, defining the evolution is unbounded and depends on time. The unboundedness and the time-dependence of $H(t)$ compromise even the existence of solutions of the evolution. In this talk, we focus on a particular case of this problem on which $H(t)$ is a family of positive, self-adjoint operators such that they have constant form domain; that is, dom $H(t)^{1/2}$ does not depend on t. For this case, we provide sufficient conditions for the solutions to exist. Moreover, we establish a new stability result for this solutions. Time permitting, we will review some applications of this stability result to the control of certain quantum systems.