



Grupo de Física Matemática
da Universidade de Lisboa

SEMINÁRIO DE FÍSICA-MATEMÁTICA

Dia 28 de Setembro de 2007 (sexta-feira), às 14h30m, na Sala B1-01

“Chernoff’s theorem for evolution families”

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Abstract

A generalized version of Chernoff’s theorem has been obtained. Namely, the version of Chernoff’s theorem for semigroups obtained in a paper by Smolyanov, Weizsaecker, and Wittich is generalized for a time-inhomogeneous case. The main theorem obtained in the current paper, Chernoff’s theorem for evolution families, deals with a family of time-dependent generators of semigroups A_t on a Banach space, a two-parameter family of operators $Q_{t,t+\Delta t}$ satisfying the relation: $\frac{\partial}{\partial \Delta t} Q_{t,t+\Delta t} |_{\Delta t=0} = A_t$, whose products $Q_{t_i,t_{i+1}} \dots Q_{t_{k-1},t_k}$ are uniformly bounded for all subpartitions $s = t_0 < t_1 < \dots < t_n = t$. The theorem states that $Q_{t_0,t_1} \dots Q_{t_{n-1},t_n}$ converges to an evolution family $U(s,t)$ solving a non-autonomous Cauchy problem. Furthermore, the theorem is formulated for a particular case when the generators A_t are time dependent second order differential operators. Finally, an example of application of this theorem to a construction of time-inhomogeneous diffusions on a compact Riemannian manifold is given.

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