L^p-theory for Schrödinger systems

Abdelaziz Rhandi
University of Salerno

In this talk we study for $p \in (1, \infty)$ the L^p-realization of the vector-valued Schrödinger operator $\mathcal{L}u := \mathrm{div}(Q\nabla u) + Vu$. Using a noncommutative version of the Dore–Venni theorem due to Monniaux and Prüss, and a perturbation theorem by Okazawa, we prove that L_p, the L^p-realization of $\mathcal{L}$, defined on the intersection of the natural domains of the differential and multiplication operators which form $\mathcal{L}$, generates a strongly continuous contraction semigroup on $L^p(\mathbb{R}^d; \mathbb{C}^m)$. We also study additional properties of the semigroup such as positivity, ultracontractivity, Gaussian estimates and compactness of the resolvent. We end the talk by giving several examples and counterexamples.

The talk is based on two joint works, the first with Markus Kunze, Luca Lorenzi and Abdallah Maichine, and the second in collaboration with Abdallah Maichine.