Energy Estimates for Ornstein-Uhlenbeck Operators in Exponentially Weighted L^p-Spaces

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Abstract. L^p-energy estimates of Ornstein-Uhlenbeck operators serve as a special tool for solving their identification problem, and for investigating spatial behavior of rotating waves in reaction-diffusion systems. Proving such types of estimates requires the diffusion matrix A to satisfy an L^p-dissipativity condition. This condition is equivalent to a lower p-dependent bound for the first antieigenvalue of A which measures its maximal real turning angle.
In this talk we present exponentially weighted L^p-energy estimates for additive variable coefficient perturbations of complex-valued Ornstein-Uhlenbeck operators. The proof is discussed in great detail, uses cut-off functions, Fatou's lemma and Lebesgue's dominated convergence, and is based on the L^p-dissipativity condition for the diffusion matrix A. A geometric interpretation of this condition is given in terms of a lower p-dependent bound for the first antieigenvalue of A. We outline the main idea of proof which is based on minimization principles via the method of Lagrange multipliers. Finally, we discuss some special cases in which the first antieigenvalue can be expressed in terms of eigenvalues.

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