



Minisymposium 4 - Spectral Theory and Ergodic Operators

Estimates for the spectral asymptotic in a Large Coupling Limit

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We present asymptotically sharp estimates for the convergence of eigenvalues and spectral families in the Large Coupling Limit. We reformulate the spectral convergence problem for a class of stiff problems (or non-inhibited problems in the terminology of Sanchez-Palencia) as a task of estimating the accuracy of the Rayleigh–Ritz approximations to the spectrum of an elliptic (positive definite) operator. Our argumentation is based on recent approximation estimates, by the author, which are stable in such “ill-behaved situations”. The theory is first presented in an abstract setting, since we consider applications to problems both in Quantum and Classical Mechanics. After giving the general results we present a study of the spectral asymptotics of Schroedinger operators with deep well potentials and a study of the spectral asymptotics for certain 1D approximations in the Theory of Elasticity as the diameter of the thin elastic body diminishes. Our theory is also applicable to standard singularly perturbed problems but such models will not be further considered in this talk.