

Large coupling convergence

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Let \mathcal{E} be a densely defined non-negative closed quadratic form in a Hilbert space \mathcal{H} and A the non-negative self-adjoint operator associated to \mathcal{E} in the sense of Kato's representation theorem. Let P be a non-negative quadratic form in \mathcal{H} and assume that the sum $\mathcal{E} + bP$ is a densely defined closed quadratic form for one and therefore every $b > 0$. Let A_b be the self-adjoint operator in \mathcal{H} associated to $\mathcal{E} + bP$. By Kato's monotone convergence theorem, the resolvents $(A_b + 1)^{-1}$ converge strongly, as $b \rightarrow \infty$.

We derive conditions which are sufficient in order that the resolvents converge even w.r.t. the operator norm and provide estimates for the rate of convergence both from above and from below.