

SCHRÖDINGER TYPE OPERATORS WITH UNBOUNDED DIFFUSION AND POTENTIAL TERMS

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ABSTRACT. We prove that the realization A_p in $L^p(\mathbb{R}^N)$, $1 < p < \infty$, of the Schrödinger type operator $A = (1 + |x|^\alpha)\Delta - |x|^\beta$ with domain $D(A_p) = \{u \in W^{2,p}(\mathbb{R}^N) : Au \in L^p(\mathbb{R}^N)\}$ generates a strongly continuous analytic semigroup $(T_p(t))_{t \geq 0}$ provided that $N > 2$, $\alpha > 2$ and $\beta > \alpha - 2$. Moreover this semigroup is consistent, irreducible, immediately compact and ultracontractive. We estimate the eigenfunction corresponding to the largest eigenvalue of A and then deduce some upper estimates for the heat kernel k associated to the semigroup $(T_p(t))_{t \geq 0}$.

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