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**Properties of solutions to a linear elliptic equation and the related Schrödinger semigroup**

**Abstract**

We consider the linear parabolic equation

$$\partial_t u = \Delta u + V(|x|)u$$

in the whole space, where  $V \in C^1(\mathbf{R}^N \setminus \{0\})$  is a positive function, which may be singular at the origin. To analyze the fundamental solution to this equation, the properties of solutions to the stationary problem are very useful. In the first part, we consider the stationary problem. Later, we discuss the properties of the fundamental solution to the time-evolution problem by using the decay property of the solution to the stationary problem.