# Self-adjoint extensions in quantum mechanics : general theory and applications to Schrodinger and Dirac equations with singular potentials

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Abstrak

Self-adjoint extensions in quantum mechanics begins by considering quantization problems in general, emphasizing the nontriviality of consistent operator construction by presenting paradoxes of the naïve treatment. The necessary mathematical background is then built by developing the theory of self-adjoint extensions. Through examination of various quantum-mechanical systems, the authors show how quantization problems associated with the correct definition of observables and their spectral analysis can be treated consistently for comparatively simple quantum-mechanical systems. Systems that are examined include free particles on an interval, particles in a number of potential fields including delta-like potentials, the one-dimensional Calogero problem, the Aharonov–Bohm problem, and the relativistic Coulomb problem.