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Quantization of Reparametrized Systems Using the WKB Method

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Abstract: The quantization of reparametrized systems is discussed using the WKB approximation. The Hamilton-Jacobi function, the equations of motion and the wave function---which the conditions constrain in the semiclassical limit---are determined. The success of this approach is then demonstrated for two applications. The first is an illustrative example of nonrelativistic dynamics. The second is the well-known motion of a relativistic particle in an external electromagnetic field.

Key Words: Singular Lagrangian, Parametrized systems, WKB Approximation.