

# Exact solutions of a particle in a box with a delta function potential: The factorization method

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## Abstract

We use the factorization method to find the exact eigenvalues and eigenfunctions for a particle in a box with the delta function potential  $V(x) = \lambda\delta(x - x_0)$ . We show that the presence of the potential results in the discontinuity of the corresponding ladder operators. The presence of the delta function potential allows us to obtain the full spectrum in the first step of the factorization procedure even in the weak coupling limit  $\lambda \rightarrow 0$ .