Midterm Exam 03

**Solving an ODE like it’s the Transcontinental Railroad**

When studying the problem of a particle in a finite potential well, we solved for the wave function ψ(x), by integrating a second-order linear differential equation from left-to-right (in position x space) and from right-to-left, iterating over the value of the particle’s energy E until the two integrations match at some prescribed location xmatch. What was different about this particular problem as compared to other ODE problems? Why was it important that we integrate from both directions? Discuss the advantages (and disadvantages) of solving the problem in this way. Can you envision an-other way to solve the problem while still satisfying all of the requirements that originally motivated the two-directional integration solver?