

IRES Japan 2024: Numerical Solution of Schrödinger's Equation

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Week 3 (6/24 - 6/28)

4	24-Jun	Finished harmonic oscillator code and plots Finished problem 5.1 and plots 5.2.2 Basic Program for Solving the Eigenvalue Problem With Continuation Method	Began writing code for continuation method (harmonic oscillator)
4	25-Jun	Made PowerPoint for meeting Weekly meeting Worked on fixes discussed in meeting	Runge Kutta application is wrong; check initial conditions and graphs
4	26-Jun	Fixed Runge Kutta + reviewed material to re-orient	
4	27-Jun	Fixed Problem 5.1, worked on troubleshooting end behavior of eigenfunctions	Eigenvalues were wrong + causing divergence
4	28-Jun	Meeting Obtained correct eigenvalues of box potential and finished plots Review of box potential and solutions as described in Schiff's Quantum Mechanics	
Goals for next week: finish fixing harmonic oscillator, compare both problems with analytic solutions, interim report, continue coding for continuation method			

Above is a record of my endeavors this week. I began by continuing to work on the harmonic oscillator problem and corresponding plots but found that they were not correct. However, given that I was able to finish fixing the box potential problem and obtained the correct eigenvalues, I will apply this same process to the harmonic oscillator problem when I return from the JPARC tour and hope to get it finished before the interim meeting. I had several meetings this week that were extremely helpful, and I spent a large amount of my time making the corrections that were discussed. I had a few misconceptions about the application of the Runge Kutta method and spent some time reading and studying the reference codes I was provided to get a better understanding of the process. I also took a bit of time earlier in the week to begin writing up some code for the continuation method in the next section. Next week is the interim meeting, so I expect to take some time beforehand to prepare a presentation of what I have completed thus far. I hope to include the results of the box potential and harmonic oscillator problems and general background information on the principles I have been studying.