Project 3: Green’s Function and ODE with IVP

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CST-305: Principles of Modeling and Simulation

**Installed Software and Libraries**

For this project we imported matplotlib.pyplot twice because we wanted to output two plots, sympy for the evaluation of complex equations, and numpy.

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**Script Execution without Error**

The script was executed without error.

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**Mathematical Methods in Code**

In this project, using sympy, numpy, and matplotlib, a function was created to evaluate a given equation with an output of a homologous equation. This can be seen in the code:

First, the equation is inputted into a format that sympy can read



Then, the coefficients are extracted from this equation and temporary lambda values are assigned that will be changed later.

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Next, the coefficients are changed to floats to be evaluated in a format that sympy can calculate.

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After this, the quadratic formula is added to the equation for further use

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Now, Lambda 1 and Lambda 2 are calculated

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From here, based on the lambda values, a case is determined for further calculation

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Next, this process is repeated with new values for the second equation.

After the homologous equations are determined, we can move onto the evaluation of Green’s Function.

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**Program Output**

The program outputs two plots and statements of the values of lambda for both equations.

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**Programming Style and Commenting**

The programming style for the project is fairly straightforward. Variables are kept simple and concise because there isn’t much variety in variable choice. Each section is commented clearly, and the commenting explains the process at every step.

**Hand-Done Calculations**

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