**Part a)**

Using the least squares fit on the spring force and the damping force, the coefficient were determined to be as follows:



Figure 1. Plot of spring force data and its corresponding least squares fit



Figure 2. Plot of damping force data and its corresponding least squares fit

**Part b)**

Equations (1) and (2) get converted into the following 4-equation system of 1st order ODEs:

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Final 4-equation system of 1st order ODEs:

**Part c)**

**Simulation**

**Part a)**

**Part b)**

**Part c)**