**Answer Template for Lab 3: Model of a Spring-Mass-Damper**

**ENGR 232 – Dynamic Engineering Systems**

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*First Last Summer 2022*

**Part A: The exact solution**

**Question 1:** Place the roots in this box. Do not use decimals.

**Question 1: The roots are: -(2/3)+5i and –(2/3)-5i**

**Question 2:** Find the discriminant *D*.

**Question 2: The discriminant is *D* = -8100**

**Question 3: Exact Solution for y(t).**

**Question 3: The exact solution is:**

**Question 4: Exact Solution for the derivative y'(t).**

**Question 4: The exact solution for the derivative is:**

**Question 5:** **Replace the sample graph with your completed plot.**

GRADER - Note **blue** curve

must start at +3. Image must **not** have the colorful background seen in the sample. Envelopes are not required.

**Paste your simultaneous plot here.**

**Chart, line chart

Description automatically generated**

**Part B. State Space Representation**

**Question 6: Confirm your file smd.m is working by finding** smd(0, x0) with .

**Question 6:** The value of smd(0, x0) is:

**Question 7:**  **Replace** the sample plot with your completed graph. Your work must **not** contain the footprints left by some mysterious ghost in the machine.

GRADER – Envelopes not required!

Chart

Description automatically generated

**Questions 8, 9 & 10:**  **Replace** the sample tiled plot with your completed graph. (3 points)

**Replace** the sample plot with your own tiled plot for points 8-10.

Graphical user interface

Description automatically generated with medium confidence

GRADER – Make sure the green dot is at (+3, –2).

Award one point for each of the three tiles if the graph there is complete.

Be sure all ten questions are answered. When your lab is complete, be sure to submit three files:

1. Your **completed Answer Template** as a PDF file
2. A copy of your **MATLAB Live Script**
3. A **PDF** copy of your **MATLAB Live Script** (Save-Export to PDF…)

The due date is the day after your lab section by **11:59pm** to receive full credit. You have one more day, to submit the lab (but with a small penalty), and then the window closes for good and your grade will be zero.