Homework 9

Math 469, Spring 2024

This homework is due on Friday, March 22 at 11:30 am. (Turn in your answers – via Gradescope – to questions 1–4.)

1. Read Sections 4.1–4.4. List all results and definitions from those sections that you did *not* see in your Differential Equations class.

2. Consider the following system of differential equations:

$$\begin{aligned} \frac{dx}{dt} &= xy - 25 \\ \frac{dy}{dt} &= x + y - 10 \end{aligned}$$

   (a) Is the system autonomous or non-autonomous? Linear or nonlinear?

   (b) Find all equilibria.

3. Solve the following initial-value problem:

$$\begin{aligned} \frac{dx}{dt} &= -\frac{x}{t} + e^{2t} \\ x(1) &= 3 \end{aligned}$$

4. Section 4.12 #1, 2(c), 3(a–b), 5, 9