

Homework Assignment #1

Use **Mathematica** to solve the following problems and show your solutions in a presentable fashion, instead of direct printout from each execution without any explanation.

1. Given the following system

$$\begin{aligned}4x_1 + 5x_2 - 5x_3 - 8x_4 - 2x_5 &= 5 \\7x_1 + 2x_2 - 10x_3 - x_4 - 6x_5 &= -4 \\6x_1 + 2x_2 + 10x_3 - 10x_4 + 7x_5 &= -7 \\-8x_1 - x_2 - 4x_3 + 3x_5 &= 5 \\8x_1 - 7x_2 - 3x_3 + 10x_4 + 5x_5 &= 7\end{aligned}$$

- (a) Solve the above system.
- (b) Find the determinant, eigenvalues and corresponding eigenvectors of the coefficient matrix.

2. Plot the following two functions in one graph

$$f(x) = 3 \sin(x)$$

and

$$g(x) = x - \frac{x^3}{8} + \frac{x^5}{100}$$

with at least 3 **visible enhancements** to distinguish the two functions, as supposed to the standard output.