Aydın Adnan Menderes University,
Department of Computer Engineering CSE 317 Numerical Analysis, 2024-2025 FALL

First Homework
DUE DATE: November 14, 2024.

Q1 Take a as the last digit of your Student Id number and consider the linear system

$$\begin{aligned} 5.ax_1 - 2x_2 + x_3 + 2x_5 &= 3 \\ -0.ax_1 + 4x_2 - 2x_3 + x_5 &= 2 \\ 2.ax_1 - x_2 + 6x_3 - 2x_4 - x_5 &= -4 \\ -x_1 - 2x_2 + x_3 - 7x_4 - 2x_5 &= 3 \\ -3x_1 - x_2 + x_3 + 5.1ax_5 &= 5 \end{aligned}$$

(a) Write the Gauss- Seidel iteration scheme for the given system.

(b) Write a Python program which computes 10 iteratates with the Gauss-Seidel method starting with

$$x^{(0)} = [0 \;\; 1 \;\; 0 \;\; 1 \;\; 0]^T.$$

(c) Write a Python program which computes 10 iteratates with the Jacobi method starting with

$$x^{(0)} = [0 \;\; 1 \;\; 0 \;\; 1 \;\; 0]^T.$$

(d) Return your solution file containing the solution of part (a), the Python code and the output of your Python code.