Engineering Software Laboratory (ME69003)

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Question 1

Solve the given two simultaneous equations using the Multivariable Newton-Raphson method in Excel (at least upto 5 Iterations)

$$x^2 + xy - 9 = 0$$
$$3xy^2 + y - 55 = 0$$

Initial guess for x is

$$x_0 = 1.25$$

Initial guess for y is

$$y_0 = 2.5$$

Question 2

Find roots of following equation using the Muller's scheme in Excel

$$x^3 + x^2 - 3x - 5 = 0$$

Initial guesses are

$$2, -1 \pm 0.5i$$

Question 3

Find roots of following equation using the the Weierstrass-Durand-Kerner method in Excel (You effectively need to plot root locus)

$$x^3 + 5x^2 + 10x - k = 0$$

Initial guesses for k=0 are,

$$0, -2.5 + 2i, -2.5 - 2i$$

Initial guesses for k=6 are,

$$-1, -2 + 1.5i, -2 - 1.5i$$

Initial guesses for k=25 are,

$$-4, -0.5 + 2.5i, -0.5 - 2.5i$$