

Key Problems

Problem 1.

Write a Python program that defines a function `Gauss(matrix)` that returns an echelon form of the matrix `matrix`. Then use this code to find an echelon form of the following matrices:

a) `A = np.array([[1,1,1,3,-1],[1,2,4,7,3],[2,3,5,10,2]])`

b) `B = np.random.randn(10,5)`

Problem 2.

Write a Python program that defines a function `determinant(matrix)` that computes the determinant of the square matrix `matrix` using Gaussian elimination. You may use `Gauss(matrix)` as a starting point.

Problem 3.

Find all complex roots of the equation $x^3 + 8 = 0$, and make a figure that shows the roots in the complex plane.

Problem 4.

Compute the rank of the matrix given by

$$A = \begin{pmatrix} i & 1 & 1 \\ 1 & i & 1 \\ 1 & 1 & i \end{pmatrix}$$

Exercise problems

Exercise problems: Eriksen [E] A.1 - A.6 (see It's Learning)

Answers to Key Problems

Problem 3.

$$x = -2, x = -1 \pm i\sqrt{3}$$

Problem 4.

3