

Tutorial Exercise Week 5

Qs. 1 Linear Equations, Gaussian Elimination

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Using Gaussian Elimination, i.e. the Gauss/Jordan method, solve the following system of linear equations.

$$2 * x_1 + 4 * x_2 + 6 * x_3 = 16$$

$$2 * x_1 + x_2 - x_3 = -6$$

$$-x_1 + 4 * x_2 + 2 * x_3 = 0$$

Qs. 2 Matrix Inverse, Gauss/Jordan Method

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Using the Gauss/Jordan Method, find the inverse of the matrix, A , when

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$$

Qs. 3 Solving Linear Equations via Matrix Inverse

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For a Matrix A and vector, x , and constant vector, c , if

$$A * x = c$$

then

$$x = A^{-1} * c$$

provided, A^{-1} exists.

Solve the following system of linear equations using this approach of Matrix Inverse.

$$\begin{aligned}x_1 + 2 * x_2 + 3 * x_3 &= 5 \\2 * x_1 + 5 * x_2 + 3 * x_3 &= 3 \\x_1 + 8 * x_3 &= 17\end{aligned}$$

(See next page)

Express this system of linear equations in the form of the equation:

$$A * x = c$$

where A is a matrix, x is the vector of the unknowns and c is a vector of constants and solve for the vector, x .

(See Qs. 2)