

Problem 1 Given the following system of equations:

$$3x + 2y - 5z = 1$$

$$4x - y + z = 0$$

$$x - z = 2$$

find all solutions using Gauss-Jordan elimination procedure. Is this an example of consistent system? Why?

Problem 2 Find the rank of the following matrix

$$\begin{pmatrix} -1 & 3 & 8 & -2 & 1 \\ -1 & 3 & 9 & -1 & 3 \\ 1 & -3 & -9 & 1 & -3 \\ 0 & 0 & 0 & 0 & 2 \end{pmatrix}$$

Problem 3 In a certain sense, the following system is not linear:

$$2 \sin \alpha - \cos \beta + 3 \tan \gamma = 3$$

$$4 \sin \alpha + 2 \cos \beta - 2 \tan \gamma = 10$$

$$6 \sin \alpha - 3 \cos \beta + \tan \gamma = 9.$$

However, there is still a way to do Gauss-Jordan elimination on it. Does a solution exist for α , β , and γ ?