

Homework #7

You must justify all steps to get credit for your work

Please submit the HW via CASA or email your completed assignment as a single PDF file to jshi24@CougarNet.UH.EDU.

(1)[3Pts] Apply the method of Gaussian elimination to find the solution set of the following system of equations or show that it has no solution.

$$\begin{aligned}3x + 3y + z &= 15 \\2x - y + z &= 3 \\x + 4y &= 9\end{aligned}$$

(2)[3Pts] Apply the method of Gaussian elimination to find the solution set of the following system of equations or show that it has no solution.

$$\begin{aligned}x + y + z &= 4 \\2x + y + 3z &= 7 \\x - y - z &= -2 \\2x - y - 3z &= -3\end{aligned}$$

(3)[3Pts] Apply the method of Gaussian elimination to find the solution set of the following system of equations or show that it has no solution.

$$\begin{aligned}2x + 2y - z &= 2 \\x - 3y + 2z &= 0\end{aligned}$$

(4)[4Pts] Determine the values of the parameter k such that the following system of equations has unique solution, no solution or infinitely many solutions.

$$\begin{aligned}ky + kz &= k \\kx + 2y &= 1 \\-3x + y &= -k\end{aligned}$$

(5)[4Pts] Determine the values of the parameter k such that the following system of equations has unique solution, no solution or infinitely many solutions.

$$\begin{aligned}2x + y - 5z &= k \\-x + 3y + kz &= 0 \\3x + 2y - 9z &= 0 \\-x + y - 2z &= 0\end{aligned}$$

(6)[3Pts] Let $Ax = b$ be a system of m linear equations with n unknowns. Establish which of the following statement is TRUE; if FALSE, you need to show a counter-example.

- (a) If $n > m$ the system has always at least one solution
- (b) If $n < m$, the system has never a solution.
- (c) If $b = 0$, the system has at least one solution.