Lecture 1

Wednesday, September 3, 2025   6:31 AM

We will cover Chapters 1,2,3,4,5 of the textbook.
- Chapter 1: solve linear system of equations
- Chapter 2: matrix
- Chapter 3: determinant of a matrix
- Chapter 4: vector spaces
- Chapter 5: eigenvalues and eigenvectors

A linear system of equations can be represented by a matrix (the augmented matrix). The number of rows of this matrix is the number of equations in the system. The number of column is one more than the number of unknowns.

One can solve a linear system using the elimination method, which can be done by manipulating the matrix. Row reduction is an operator on the matrix that doesn't change the solutions of the linear system.

Example of a system that has only one solution (consistent system):

$$\begin{cases} x + 2y + 3z &= 9 \\ 2x - y + z &= 8 \\ 3x - z &= 3 \end{cases}$$

Example of a system that has no solutions (inconsistent system):

$$\begin{cases} x + y &= 2 \\ 2x + 2x &= 3 \end{cases}$$

Example of a system that has infinitely many solutions (consistent system):

$$\begin{cases} x + y &= 2 \\ 2x + 2x &= 4 \end{cases}$$