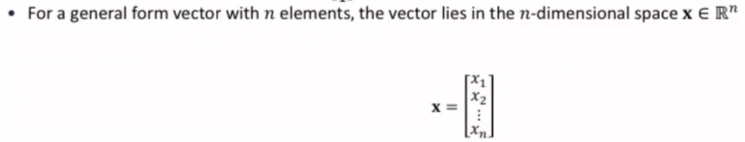
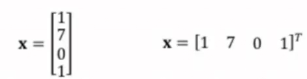
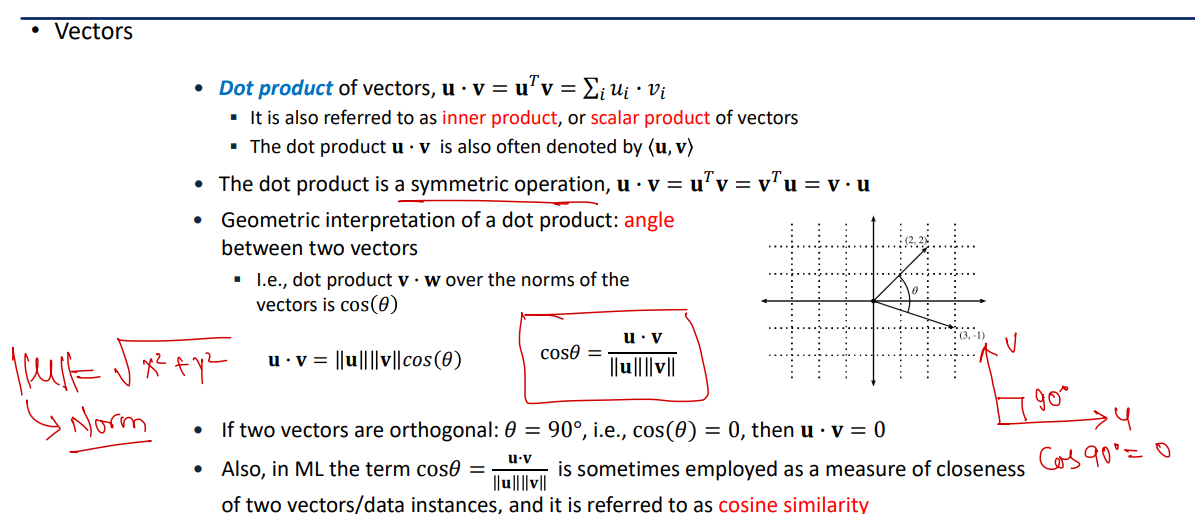
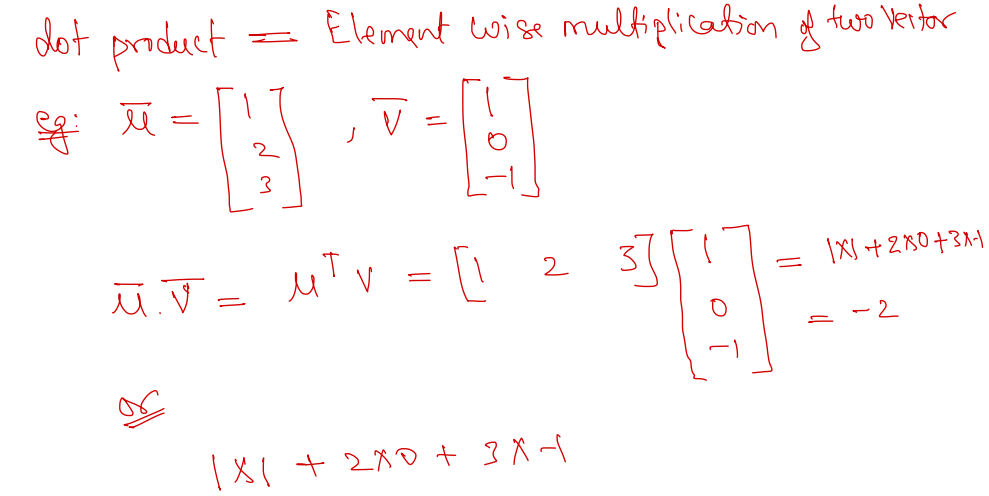
* Linear algebra is a branch of mathematics that deals with vector spaces and linear mappings between these spaces. It provides a framework for representing and solving a wide range of problems in mathematics, science, engineering, and computer science.
* Key concepts in linear algebra include vectors, which represent quantities with both magnitude and direction, and matrices, which are rectangular array of numbers that can represent linear transformations. Other important topics include eigenvalues and eigenvectors, determinants, systems of linear equations, and vector spaces.
* Linear algebra has numerous applications, such as in computer graphics, data analysis, optimization, physics, engineering, and many areas of applied mathematics.
* **Vectors:**
  + Vector definition:
    - Computer Science: vector is a one-dimensional array of ordered read-valued scalars.
    - Mathematics: vector is quantity possessing both magnitude and direction, represented by an arrow indicating the direction, and the length of which is proportional to the magnitude.
  + Vectors are written in column form or in row form:
    - Denoted by bold-font lower-case letters, sometime an arrow or bar on the character:

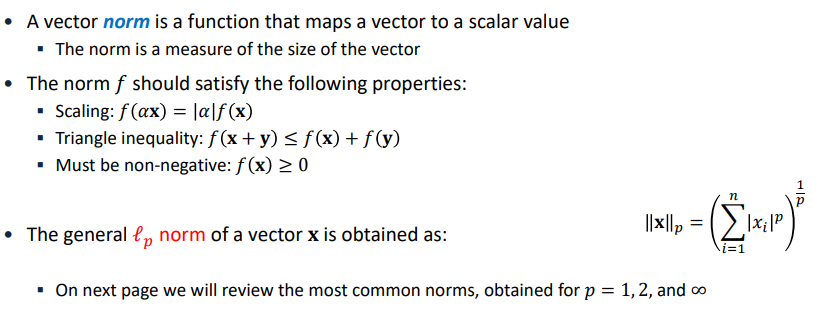


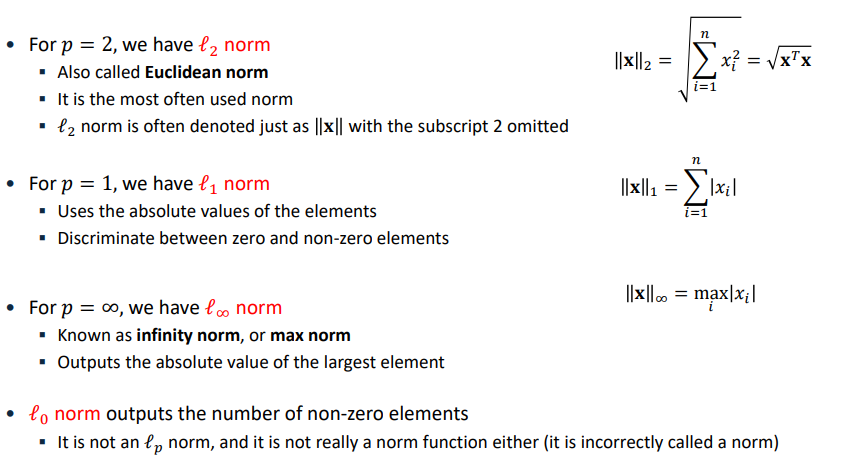
* + Transpose 🡪 Row 🡨🡪Column
  + R represents real number.
* **Dot Product and Angels:**



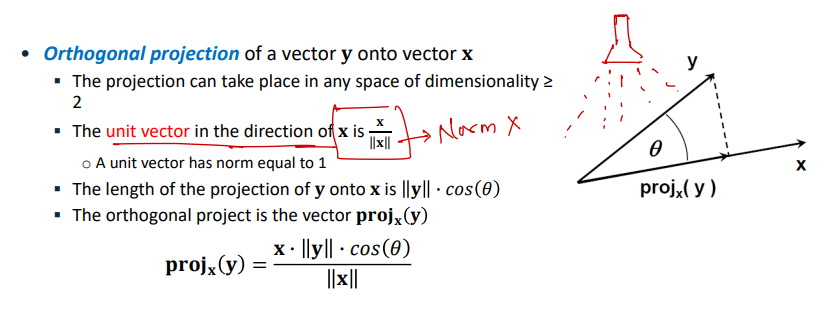


* + Three mathematical things required for Machine Learning:
    - Linear Algebra
    - Basic Calculus
    - Probability and Statistics
* **Norm of a Vector:**

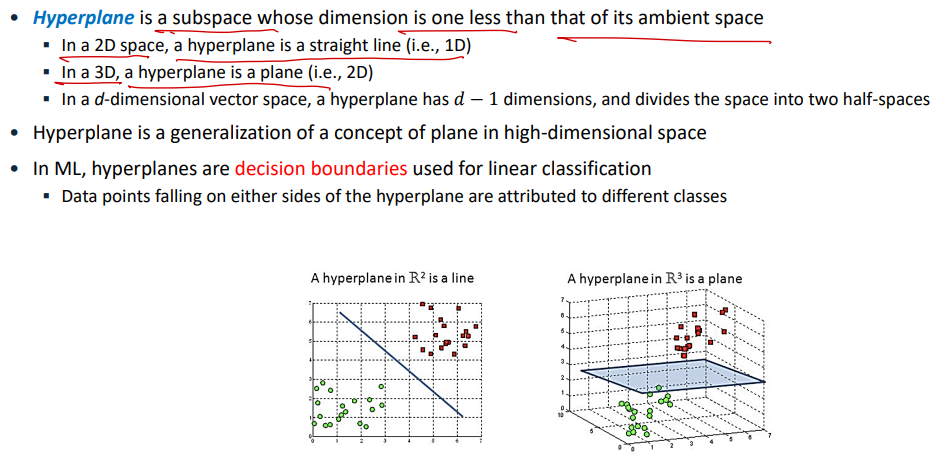




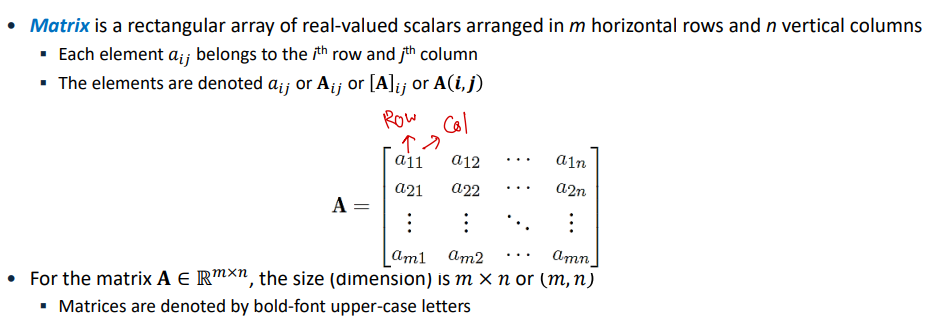
* **Vector Projection:**

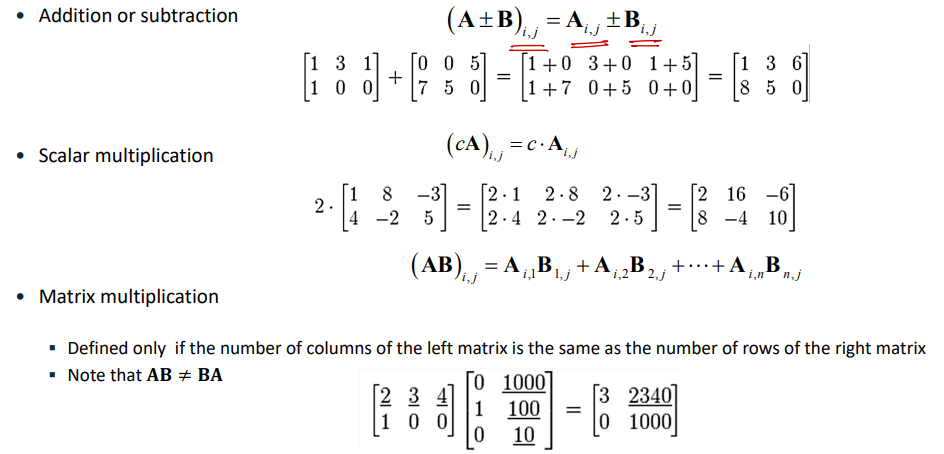
****

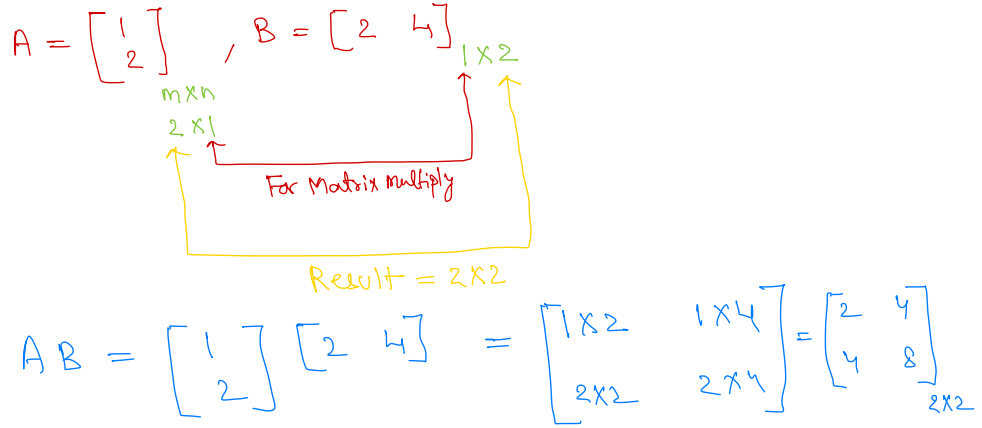
* **Hyperplanes:**

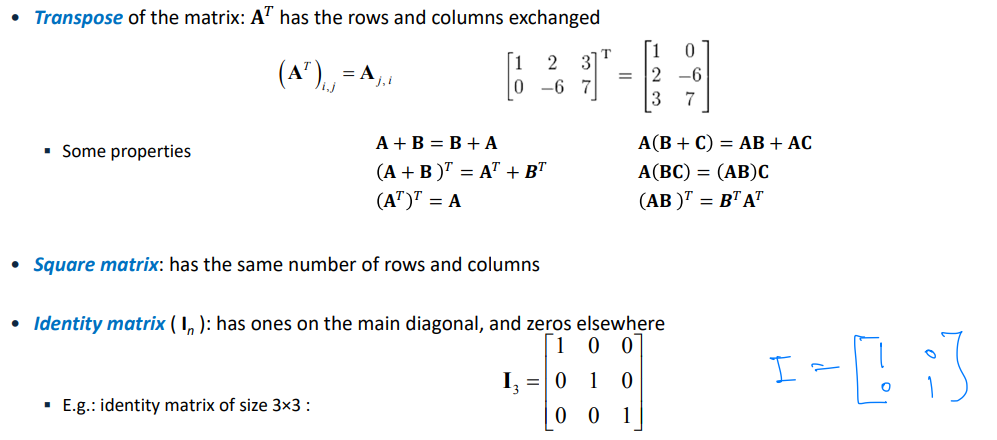
****

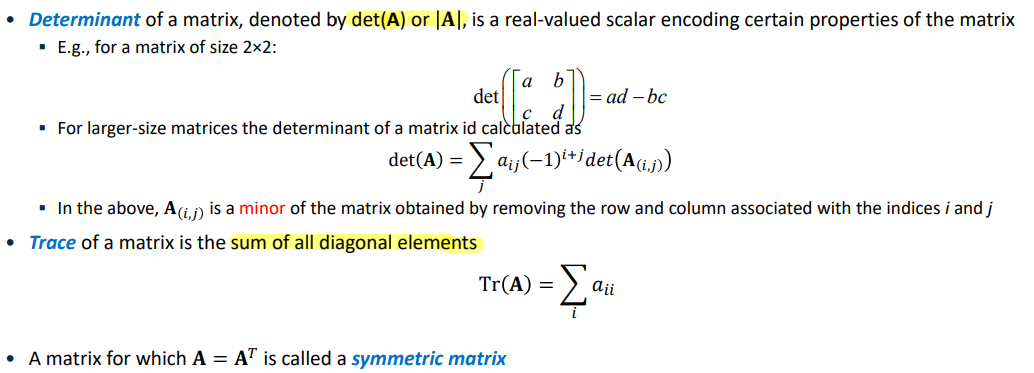
* **Metrices:**

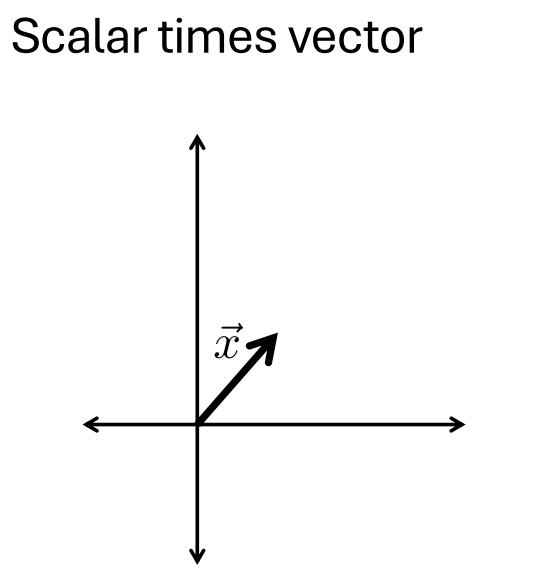
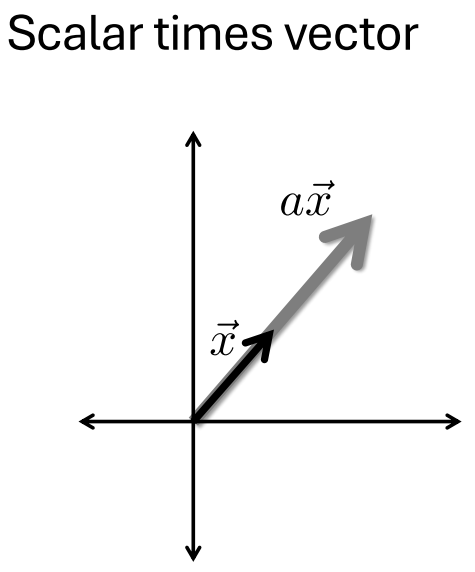
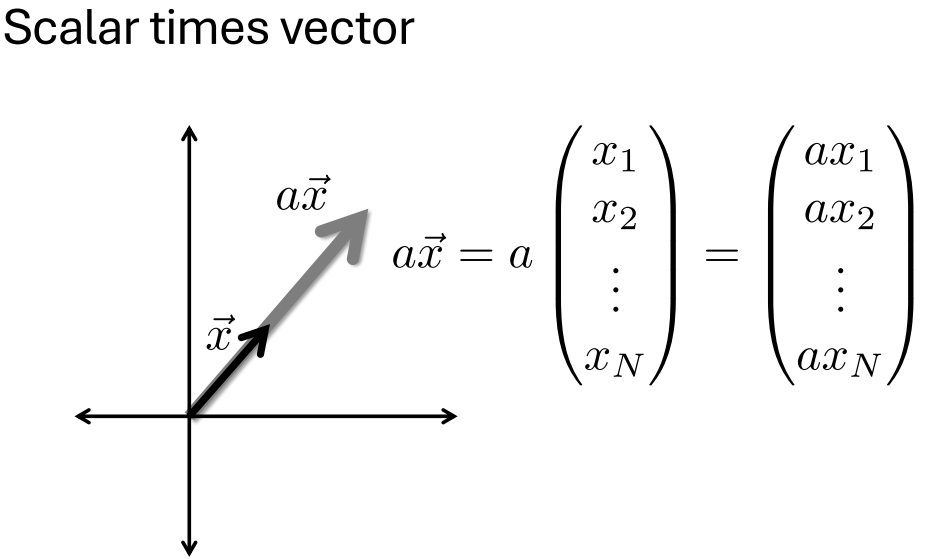
****

****

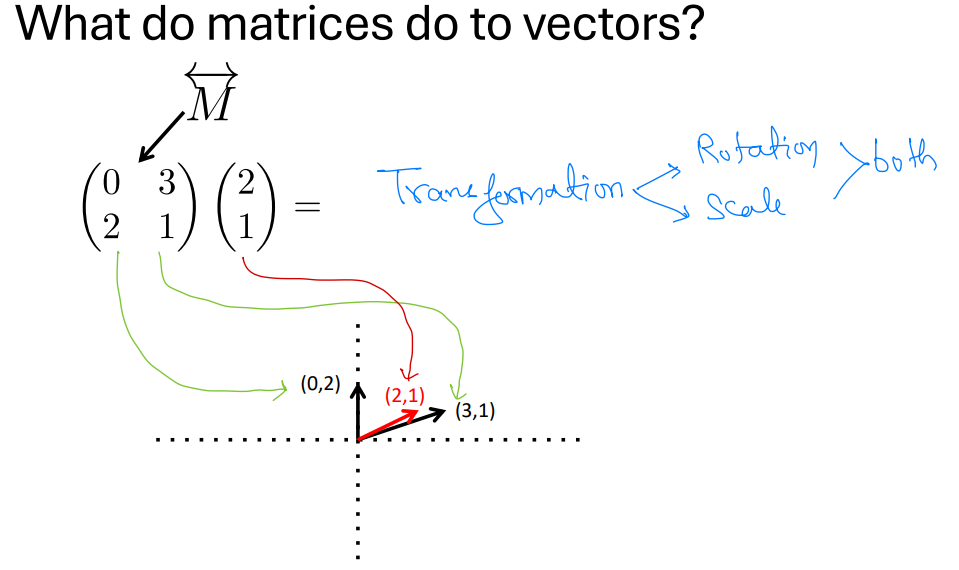
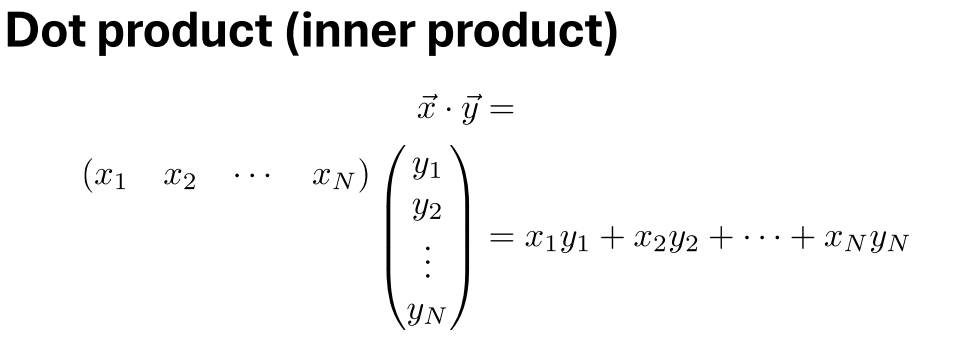
****

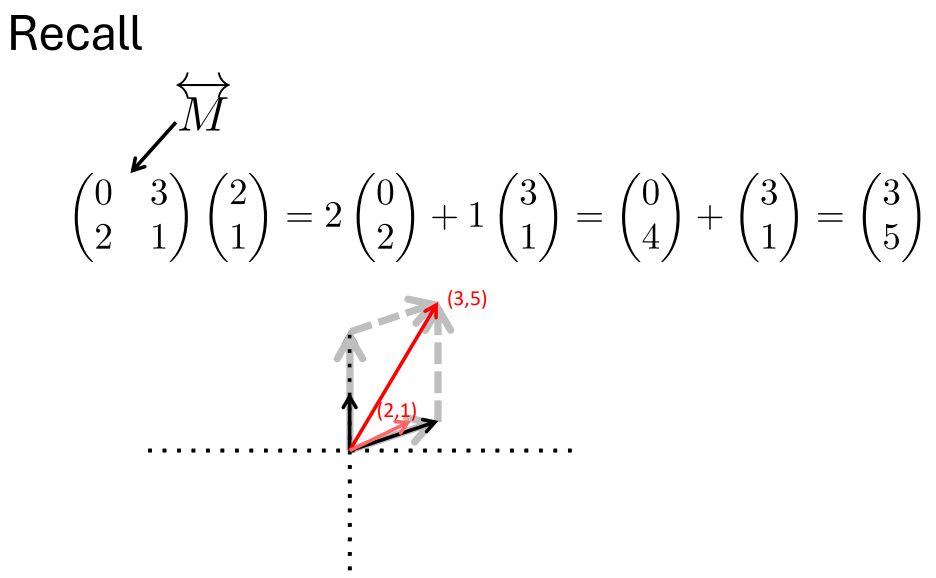
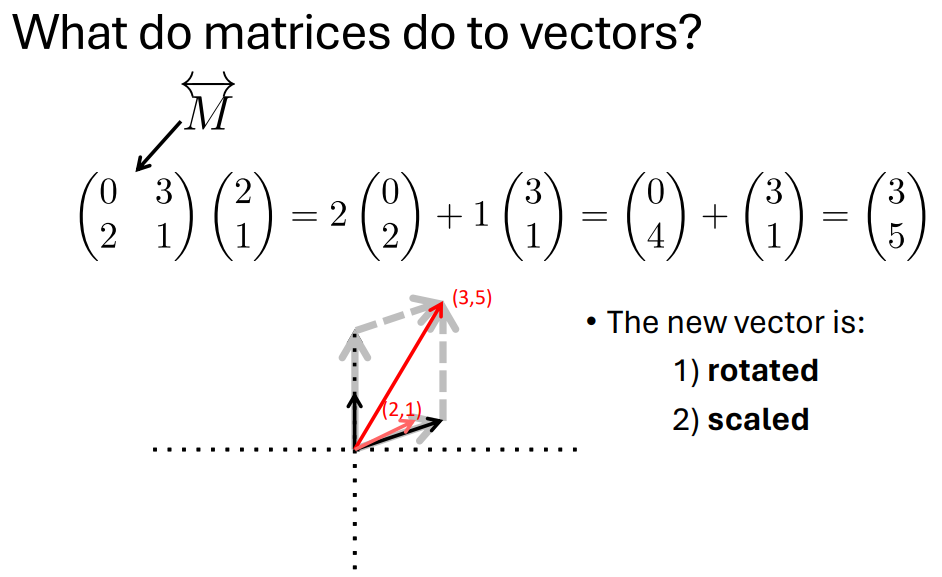
****

****

**** **** 

* **Multiplication:**

****

**** ****