



## MODULE 1

#### LINEAR SYSTEMS OF EQUATIONS

SOLUTION BY GAUSS ELIMINATION, ROW ECHELON FORM AND RANK OF A MATRIX

FUNDAMENTAL THEOREM FOR LINEAR SYSTEMS HOMOGENEOUS AND NON-HOMOGENEOUS

EIGEN VALUES AND EIGEN VECTORS OF MATRICES, DIAGONALIZATION OF MATRICES.



# MODULE 2

#### **VECTOR SPACES**

LINEAR COMBINATIONS OF VECTORS IN A VECTOR SPACE, SPANNING SETS

LINEAR DEPENDENCE AND INDEPENDENCE, BASIS FOR A VECTOR SPACE

THE DIMENSION OF VECTOR SPACE,
COORDINATE REPRESENTATION IN R<sup>n</sup>, CHANGE OF BASIS IN R<sup>n</sup>



## MODULE 3

VECTOR LENGTH AND UNIT VECTOR,
DOT PRODUCT AND ANGLE BETWEEN TWOVECTORS

THE CAUCHY- SCHWARZ INEQUALITY, INNER PRODUCT

ORTHOGONAL PROJECTIONS IN INNER PRODUCT SPACES

ORTHOGONAL AND ORTHONORMAL SETS,
ORTHOGONAL AND ORTHONORMAL BASIS,
GRAM-SCHMIDT ORTHONORMALIZATION PROCESS

PROJECTION ONTO A SUBSPACE



# MODULE 4

LINEAR TRANSFORMATIONS, PROPERTIES OF LINEAR TRANSFORMATIONS

LINEAR TRANSFORMATION GIVEN BY A MATRIX

KERNEL OF A LINEAR TRANSFORMATION AND ITS BASIS

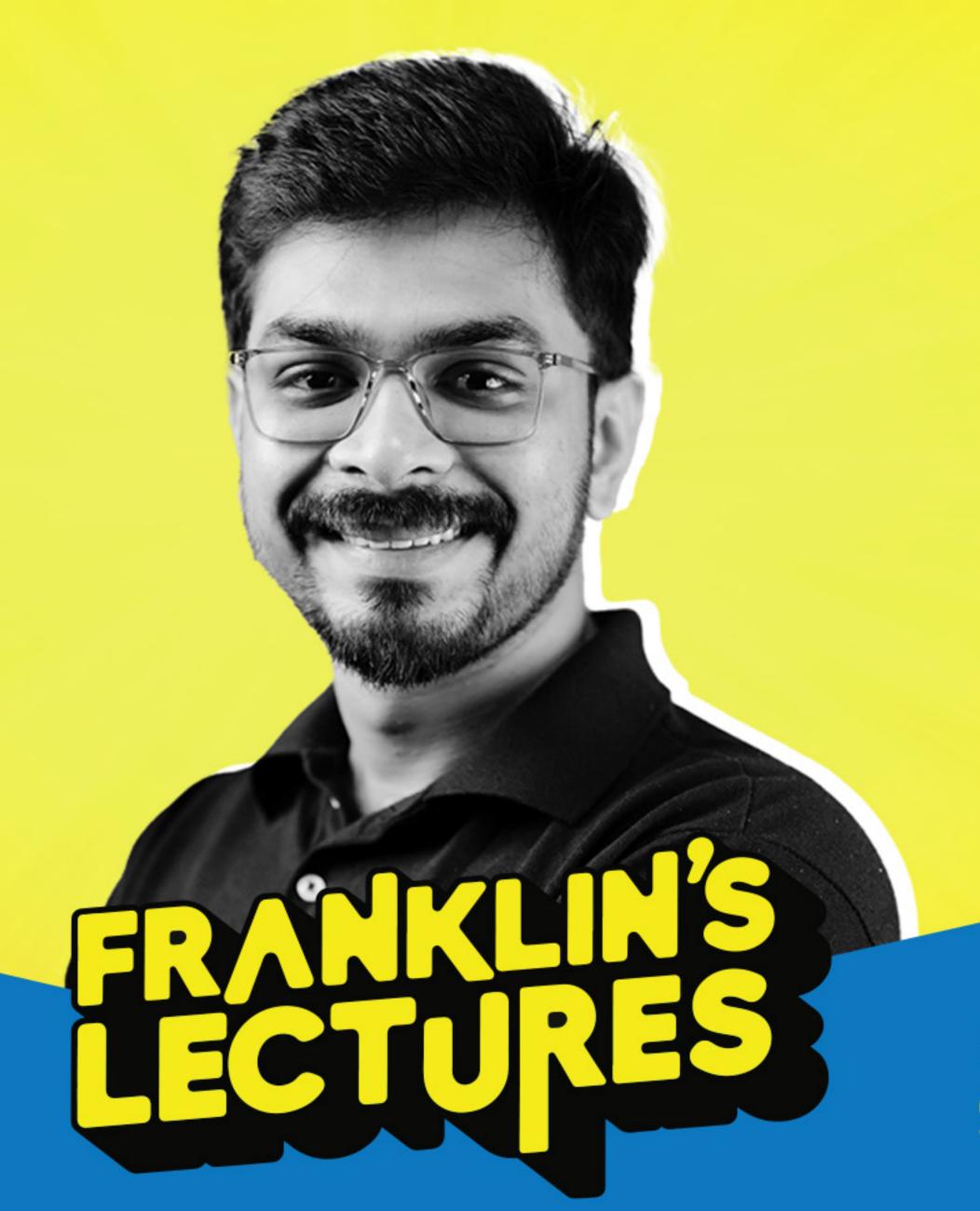
RANGE OF A LINEAR TRANSFORMATION AND ITS BASIS

RANK AND NULLITY OF A LINEAR TRANSFORMATION

**RANK AND NULLITY THEOREM** 

MATRICES FOR LINEAR TRANSFORMATIONS





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