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1. **Linear Transformation** :

LT { T: U-V} is a function that carries elements of the vector space U (domain) to vector space (co-domain) .

i) **Examples on Linear Transformation:**

INPUT U OUTPUT V

(Domain) (Co-domain)

T

U V

Here in the first example, 4 elements in domain U transforms 4 elements in co-domain V

T(d) = z

T(c) = x = y

T(a) = T(b) = w

ii) **More examples on Linear Transformation:**

INPUT A OUTPUT B

(Domain) (Co-domain)

T

A B

Here 4 elements in domain A transform 3 elements in co-domain B.

1. A = { 1, 9, 3 } { 2, 6 ,70} { 0 ,1 ,3}

X = 1

4

-8

T(x) = Ax

T(x) = 1 9 3 1

2 6 7 4

0 -1 3 -8

1 1 + 4 9 -8 3

2 6 7

0 -1 3

=

1+ 36 -24 13

2+ 24 -56 = -30

0 - 4 – 24 -28

Hence , 13 transforms 1

-30 4

-28 -8

1. **RANK OF MATRIX:**

Given a matrix A, the code of the largest square matrix or sub-matrix of A whose determinant is not equal to zero is known as Rank.

Mathematical Example:

A matrix Y = 1 2 0

2 1 3

0 3 1

Finding the rank:

Get the determinant;

|Y| = 1 (1 - 9) -2 (2 - 0) +0

|Y| = -8 – 4 = -12 ≠0

Hence, the rank of Y is 3.