**ASUK FAVOUR FRANCIS**

**MAT 204**

**COMPUTER SCIENCE**

**18/SCI01/021**

A **linear transformation**, T:U→VT:U→V, is a function that carries elements of the vector space UU (called the **domain**) to the vector space VV (called the **codomain**), and which has two additional properties

1. T(u1+u2)=T(u1)+T(u2)T(u1+u2)=T(u1)+T(u2) for all u1,u2∈Uu1,u2∈U
2. T(αu)=αT(u)T(αu)=αT(u) for all u∈Uu∈U and all α∈C

4 3 0

6 1 -1

5 2 -4

4 2 1

3 1 -1

2 0 1

0 1 3

-1 0 2

4 -2 1

A =

B =

C =

3 3 0

2 1 -1

1 3 -1

0 1 3

1 0 2

4 2 1

E =

D =

1. **LINEAR TRANSFORMATION OF A , IF VEXTOR x = (I,J,K)**

0 1 3

-1 0 2

4 -2 1

A = x =

a

b

c

3

2

1

1

0

-2

0

-1

4

T(x)= a + b + c

3c

2c

c

 b

 0

-2b

0

-a

4a

 + +

T(x) =

4 2 1

3 1 -1

2 0 1

 J + 3K

 -I + 2K

4I - 2J + K

I

J

K

Hence the transformation of gives;

1. **LINEAR TRANSFORMATION OF B , IF VEXTOR x = (I,J,K)**

B = x =

0 + J + 3K

-I + 0 + 2K

4I - 2J + K

I

J

K

1

-1

1

2

1

0

4

3

2

T(x)= a + b + c

 K

-K

 K

 2J

 J

 0

4I

3I

2I

 + +

T(x) =

4I + 2J + K

3I + J - K

2I + 0 + K

4 3 0

6 1 -1

5 2 -4

I

J

K

Hence the transformation of gives;

1. **LINEAR TRANSFORMATION OF C , IF VEXTOR x = (a,b,c)**

0 1 3

1 0 2

4 2 1

C = x =

a

b

c

0

-1

-4

3

1

2

4

6

5

T(x)= a + b + c

 0

-c

-4c

 3b

 b

 2b

4a

6a

5a

 + +

4a + 3b + 0

6a + b - c

5a + 2b - 4c

T(x) =

4a + 2b + c

3a + b - c

 2a + c

a

b

c

Hence the transformation of gives;

1. **LINEAR TRANSFORMATION OF D , IF VEXTOR x = (a,b,c)**

 4a + 3b

6a + b - c

5a + 2b - 4c

D = x =

a

b

c

3

2

1

1

0

2

0

1

4

T(x)= a + b + c

3c

2c

c

 b

 0

2b

0

a

4a

 + +

T(x) =

3 3 0

2 1 -1

1 3 -1

 b + 3c

 a + 2c

4a + 2b + c

a

b

c

Hence the transformation of gives;

1. **LINEAR TRANSFORMATION OF E , IF VEXTOR x = (a,b,c)**

0 + b + 3c

a + 0 + 2c

4a + 2b + c

E = x =

a

b

c

0

-1

-1

3

1

3

3

2

1

T(x)= a + b + c

 0

-c

-c

 3b

 b

 3b

3a

2a

a

 + +

T(x) =

3a + 3b + 0

2a + b - c

a - 3b - c

3a + 3b + 0

2a + b - c

a - 3b - c

a

b

c

Hence the transformation of gives;