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1.Example 1: Let Y=W=F. For x is an element of Y, define F(X)=mx+b, where m and b are real numbers and b is not equal to 0, show that F is not a linear transformation.

solution: Additivity, F(X)= m(X)+b:

F(X+Y)=m(X+Y)+b=mX + mY +b

However, F(X)+F(Y)=(mX + b)+ (mY+b)=mX+mY+2b

since b is not equal 0,2b is not a b so F(X+Y) is not qual to F(X)+F(Y) for all x,y is an element V,and F is not linear.

Example: Let V=W=E. Define T(x)=mx, where m is a fixed real number. Show that T is a linear transformation.

Solution: We must show that T is additive and homogenous. For the additivity, we let x and y be in E and calculate

T(x+y)=m(x+y)=mx+my

T(x)+T(y)=mx+my

since T(x+y)=T(x)+T(y), we know that T is additive. Also T os homogenous since

T(rx)= m(rx)= (mr)x= r(mx)=rT(x)

Thus T is a linear transformation.

3.Rank of a matrix A is the order of the largest square matrix or sub maytrix of A whose sterminant is not equal to 0.

Example1:

find the rank of A= 3 1 2

2 0 5

5 1 7

Solution:

|A|=3(0-5)-1(14-25)+2(2-0)

|A|=3(-5)-1(-11)+2(2)

|A|=-15+11+4=0 Hence,

we need to consider a sub matrix of A

Asub = 3 1

2 0

|Asub|= 0-1= -2 is not equal 0

Hence, the rank of A is 2.

Example2: Find the rank of

A= 1 2 0

2 1 3

0 3 1

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

|A|= -8-4= -12 is not equal to 0

Hence, the rank of A is 3.