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Matric/no:-18/SCI01/072

Department:-computer science

Course:-math 204

 Answer

1 This is a space consisting of vectors, together with the associative and commutative operation of addition of vectors, and the associative and distributive operation of multiplication of vectors by scalars.

3 (1) (5) (0) (0)

 (2) & (2)B + (0)& = (0)

 (3) (1) (1) (0)

&+3B=0 –equ1

2&+2B=0-equ2

3&+B+&=0-equ 3

From equ1

&=3B-equ 4

Put 4 in 2

2(-3B)+2B=0

 -6B+2B=0

 -4B=0

 B=0

Put B=0 in equ 2

 &=-3(0)

 &=0

Since &B,&=0 then the vectors U1,U2 and U3 are linearly independent

(1) (3) (0) (a)

(2) & + (2)B + (0) & = (b)

(3) (1) (1) (c)

 &+3B=a- equ1

 2&+2B=b- equ 2

3&+B+&=c-equ3

From equ 1 and 2

&+3B=a\*2

2&+2B=b\*1

2&+6B=2a

2&+2B=b

2&+6B=2a

2&+2B=b

4B=2a-b

 B=2a-b/4

From equ 1

 &+3B=a

&+3/1(2a-b/4)=0

&+6a-3b/4=a

&=a/1-(6a-3b/4)

&=4a-6a+3b/4

&=-2a+3b/4

Put & and B in 3

3(3b-2a/4)+2a-b/4+&=c

&=(-9b-6a)/4-(2a-b)/4

&=4c-(9b-6a)-(2a-b)/4

&=4c-9b+6a-2a+b/4

&=a-2b+c

Since the vectors are linearly independent and spans R^3 then they are a basis for R^3

2 (1) (1) (1) (a)

 (1)& + (2)B + (5) &= (b)

 (1) (3) (8) ( c)

 &+B+&=a- equ 1

&+2B+5&=b-equ 2

&+3B+8&=c-equ 3

From equ 1

&=a-B-&-equ 4

Put 4 equ 4 into equ 3 and 2

In equ 2

a-B-&+2B+5&=b

 a+B+4&=b

B+4&=b-a multiply LHS and RHS by 2

2B+8&=2b-2a

In equation 3

a-B-&+3B+8&=c

a+2B+7&=c-a-equ 6

combining equ 5 and 6

 2B+8&=2b-2a

 2B+7&=c-a

 &=(2b-2a)-(c-a)

 &=2b-2a-c+a

 &=2b-a-c

Put &in equ 5

2B+7(2b-a-c)=c-a

2B+4b-7a-7c=c-a

 2B+c-a-14b+c+a

 2B=-14b

 B=-14b/2

 =-7b

Put b and & in equ 4

&=a+7b+a-2b+c

&=2a+5b+c