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Matric/no:-18/SCI01/072

Department:-computer science

Course:-MAT 204

Answer

1. A example : let V=W=E^1.Define (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 homogeneous. For the additivity, we let X and y be in E^1 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 is homogeneous since

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

Thus T is a linear transformation

B The identity map on any module is a linear operator.

C The zero map X-0 between two left-modules (or two right-modules) over the same ring is always linear.

D For real numbers, the map X-X^2 is not linear.

E For real numbers, the map X-X + 1 is not linear (but is an affine transformation; y=x+1 is a linear equation, as the term is used in analytic geometry.)

Linear transformation or in some contexts, linear function is a mapping v-w between two modules(for example, two vector spaces) that preserves(in the sense defined below) the operations of addition and scalar multiplication. If a linear map is a bijection then it is called linear isomorphism.