

Vector Math Code

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Lb1 X
Menu("Angle Mode","Degrees",S,"Radians",T)
Lb1 S:Degree:0→B:Goto 8
Lb1 T:Radian:1→B:Lb1 8:Fix 2
0→F:0→G:0→H:0→N
ClrHome:Goto AD
Lb1 AC
Input "Vector A: ",L1
dim(L1)→D
1→Z:L1→LV3:"A"→Str1:ClrHome
Menu("Vector Type?","Rectangular",BA,"Polar
(2D)",B,"Cylindrical (3D)",G,"Spherical (3D)",H)
Lb1 BA
Output(3,2,"Vector A: ")
Output(4,3,L1)
Goto Z
Lb1 6
ClrHome
Input "Vector B: ",L2
If dim(L2)≠dim(L1):Goto Y
2→Z:L2→LV3:"B"→Str1:ClrHome
Menu("Vector Type?","Rectangular",BB,"Polar
(2D)",B,"Cylindrical (3D)",G,"Spherical (3D)",H)
Lb1 BB
Output(3,2,"Vector B: ")
Output(4,3,L2)
Goto Z
Lb1 VC
ClrHome
Input "Vector C: ",L3
If dim(L3)≠dim(L2):Goto Y
3→Z:L3→LV3:"C"→Str1:ClrHome
Menu("Vector Type?","Rectangular",CC,"Polar
(2D)",B,"Cylindrical (3D)",G,"Spherical (3D)",H)
Lb1 CC
Output(3,2,"Vector C: ")
Output(4,3,L3)
Goto Z
Lb1 9

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Menu("Vector Math 1","R to P",A,"Unit
Vector",C,"Norm",D,"Direction Cos",W,"V*Scalar",CB,"Use
A or B or C",CA,"->HomeScreen",AD)
Lbl J
Menu("Vector Math 2","Add A+B",M,"Subtract A-B",N,"DOT
P (A*B)",E,"Cross P (AxB)",F,"AngBtnVectors",I,"Comp A
on B",K,"DstPntToLine",L,"->HomeScreen",AD)
Lbl VM
Menu("Vector Math 3","RF1,RF2,(RF3)",AA,"STP
(A*(BxC))",TS,"VTP (Ax(BxC))",TV,"->HomeScreen",AD)
Lbl Z
Output(9,1,"Press ENTER to cont.")
Pause :ClrHome
Lbl AD
ClrHome
Menu("Home Screen","Vector A",AC,"Vector B",6,"Vector
C",VC,"Vector A->F",AB,"Change angle mode",X,"-
>VectorMath 1",9,"->VectorMath 2",J,"->VectorMath
3",VM,"Computer,end program!",7)
Lbl 7:ClrHome:Stop
Lbl A
If D=2:Then
R►Pr( LV3(1), LV3(2) )→L
R►Pθ( LV3(1), LV3(2) )→A
{L,A}→L4:ClrHome
Output(3,2,"PolarCrd "+Str1+": ")
Output(4,3,L4):Goto Z
Else:If D=3:Then
√( LV3(1)²+LV3(2)² )→R
angle( LV3(1)+LV3(2)*i )→A
{R,A, LV3(3)}→L4
ClrHome
Output(3,2,"CylCrd "+Str1+": ")
Output(4,3,L4)
√(sum( LV3² ) )→P
cos⁻¹( LV3(3)/P )→E
{P,A,E}→L4
Output(6,2,"SphCrd "+Str1+": ")
Output(7,3,L4)
End:End

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Goto Z
Lb1 B
LV3(1)*cos(LV3(2))→X
LV3(1)*sin(LV3(2))→Y
{X,Y}→L4:If Z=1:Then:L4→L1:L4→LV3
Else:If Z=2:Then:L4→L2:L4→LV3:Else:L4→L3:L4→LV3:End:End

ClrHome
Output(3,2,"RectCrd "+Str1+": ")
Output(4,3,L4)
Goto Z:
Lb1 G
LV3(1)*cos(LV3(2))→X
LV3(1)*sin(LV3(2))→Y
{X,Y,LV3(3)}→L4
If Z=1:Then:L4→L1:L4→LV3
Else:If Z=2:Then:L4→L2:L4→LV3:Else:L4→L3:L4→LV3:End:End
ClrHome:Output(3,2,"RectCrd "+Str1+": ")
Output(4,3,L4):Goto Z
Lb1 H
LV3(1)*sin(LV3(3))*cos(LV3(2))→X
LV3(1)*sin(LV3(3))*sin(LV3(2))→Y
LV3(1)*cos(LV3(3))→W
{X,Y,W}→L4
If Z=1:Then:L4→L1:L4→LV3
Else:If Z=2:Then:L4→L2:L4→LV3:Else:L4→L3:L4→LV3:End:End
ClrHome
Output(3,2,"RectCrd "+Str1+": ")
Output(4,3,L4):Goto Z
Lb1 C
1→F:Goto D:Lb1 1:Ø→F
LV3/A→LV3:
If Z=1:Then:LV3→L1
Else:If Z=2:Then:LV3→L2:Else:LV3→L3:End:End
If H=1:Goto 3:ClrHome
Output(3,2,"UnitV "+Str1+": ")
Output(4,3,LV3):Goto Z
Lb1 D
√(sum(LV3²))→A:If F=1:Goto 1:ClrHome
Output(3,2,"Norm "+Str1+": ")

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Output(4,3,A):Goto Z
Lb1 CB
ClrHome
Input "Enter Scalar: ",S
Float
toString(S)→Str9
Fix 2
LV3*S→LV3
If Z=1:Then:LV3→L1:Else:If Z=2
Then:LV3→L2:Else:LV3→L3:End:End
ClrHome:Output(3,2,"Vector "+Str1+" * "+Str9+": ")
Output(4,3,LV3):Goto Z
Lb1 F
If D=2:Then
L1(1)*L2(2)-L1(2)*L2(1)→K
If P=1:Goto 4
{Ø,Ø,K}→L1:L1→LV3:ClrHome
Output(3,2,"Cross P (AxB): ")
Output(4,3,L1):1→Z:"A"→Str1:Goto Z
Else
If D=3:Then
L1(2)*L2(3)-L1(3)*L2(2)→I
L1(1)*L2(3)-L1(3)*L2(1)→J
L1(1)*L2(2)-L1(2)*L2(1)→K
If P=1:Goto 4
{I,J,K}→L1:L1→LV3:ClrHome
Output(3,2,"Cross P (AxB): ")
Output(4,3,L1):1→Z:"A"→Str1
Goto Z:End:End
Lb1 E
sum(L1*L2)→A:If G=1:Goto 2:ClrHome
Output(3,2,"DOT P (A*B): ")
Output(4,3,A):Goto Z
Lb1 I
1→G:Goto E:Lb1 2:Ø→G
 $\sqrt{(\text{sum}(L_1^2))} * \sqrt{(\text{sum}(L_2^2))} \rightarrow M$ 
 $\cos^{-1}(A/M) \rightarrow A$ :ClrHome
If A<Ø:Then:If B=Ø:Then
A+36Ø→A:Else:A+2 $\pi$ →A:End:End
Output(3,2,"Angle: ")

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Output(4,3,A):Goto Z
Lb1 K
1→H:2→Z:Goto C:Lb1 3:Ø→H
sum(L1*L2)→A:ClrHome
Output(3,2,"Comp A on B: ")
Output(4,3,A):Goto Z
Lb1 L
1→P:Goto F:Lb1 4:Ø→P
If D=2:Then:{Ø,Ø,K}→L2:Else
{I,J,K}→L2:End
√(sum(L22))/√(sum(L12))→A:ClrHome
Output(3,2,"DPntToLine: ")
Output(4,3,A)
Goto Z
Lb1 M
L1+L2→L1:L1→LV3:"A"→Str1:1→Z
ClrHome
Output(3,2,"Sum A+B: ")
Output(4,3,L1):Goto Z
Lb1 N
L1-L2→L1:L1→LV3:"A"→Str1:1→Z
ClrHome
Output(3,2,"Diff A-B: ")
Output(4,3,L1):Goto Z
Lb1 W
LV3/√(sum(LV32))→LV3:ClrHome
Output(3,2,"DirCos "+Str1+": ")
Output(6,2,"Angles "+Str1+": ")
Output(4,3,LV3)
Output(7,3,cos-1(LV3))
Goto Z
Lb1 AA
L1/√(sum(L12))→L1
L2/√(sum(L22))→L2
If D=3
L3/√(sum(L32))→L3
List►matr(L1,L2,[A])
If D=3
List►matr(L1,L2,L3,[A])
List►matr(LF,[B])

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[A]-1*[B]→[C]
ClrHome
Output(2,2,"RF1: ")
Output(3,3,abs([C](1,1))
Output(4,2,"RF2: ")
Output(5,3,abs([C](2,1))
If D=3:Then
Output(6,2,"RF3: ")
Output(7,3,abs([C](3,1))
End
Goto Z
Lbl AB
L1→LF:ClrHome
Output(3,2,"Force vector: ")
Output(4,3,LF)
Goto Z
Lbl CA
ClrHome
Menu("Work with vector...", "A", VA, "B", VB, "C", VD)
Lbl VA
1→Z:"A"→Str1:L1→LV3
Goto 9
Lbl VB
2→Z:"B"→Str1:L2→LV3
Goto 9
Lbl VD
3→Z:"C"→Str1:L3→LV3
Goto 9
Lbl Y
ClrHome
Output(5,5,"Dimention Mismatch!")
Goto Z
Lbl TS
If D≠3:Goto Y
List►matr(L1,L2,L3,[A])
[A]T→[A]
det([A])→A
ClrHome:Output(3,2,"A*(BxC): ")
Output(4,3,A):Goto Z
Lbl TV

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$L_2(2) * L_3(3) - L_2(3) * L_3(2) \rightarrow I$
 $L_2(1) * L_3(3) - L_2(3) * L_3(1) \rightarrow J$
 $L_2(1) * L_3(2) - L_2(2) * L_3(1) \rightarrow K$
 $\{I, J, K\} \rightarrow L_2$
 $L_1(2) * L_2(3) - L_1(3) * L_2(2) \rightarrow I$
 $L_1(1) * L_2(3) - L_1(3) * L_2(1) \rightarrow J$
 $L_1(1) * L_2(2) - L_1(2) * L_2(1) \rightarrow K$
 $\{I, J, K\} \rightarrow L_1$
ClrHome
Output(3,2,"Ax(BxC): ")
Output(4,3,L₁):Goto Z