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Course:B.Sc(H) Physics Sem-5

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AIM:

Source Code:

clc

clear

disp("for cube enter 1, for cuboid enter 2")

i=input("i=")

if i==1 then

m=input("Ennter the mass of the cube in kg=")

a=input("Enter length of side of the cube in meters=")

b=a; c=a;

A(:,1)=[(m/3)\*((b^2)+(c^2));(-(m/4)\*a\*b);(-(m/4)\*a\*c)]

A(:,2)=[(-(m/4)\*a\*b);(m/3)\*((a^2)+(c^2));(-(m/4)\*b\*c)]

A(:,3)=[(-(m/4)\*a\*c);(-(m/4)\*c\*b);(m/3)\*((a^2)+(b^2))]

disp(A,"Momentm of Inertia tensor matrix for cube:")

[E,H]=spec(A)

Q=inv(E)

D=Q\*A\*E

disp(clean(D),"Diagonalized matrix:")

disp(H,"Eigenvalues of moment of inertia matrix using spec command:")

disp(H(1,1),"Moment of innertia alonng x-axis:")

disp(H(2,2),"Moment of innertia alonng y-axis:")

disp(H(3,3),"Moment of innertia alonng z-axis:")

else

m=input("Ennter the mass of the cube in kg=")

a=input("Enter length of side of the cuboid in meter=")

b=input("Enter breadth of side of the cuboid in meter=")

c=input("Enter height of side of the cuboid in meters=")

A(:,1)=[(m/3)\*((b^2)+(c^2));(-(m/4)\*a\*b);(-(m/4)\*a\*c)]

A(:,2)=[(-(m/4)\*a\*b);(m/3)\*((a^2)+(c^2));(-(m/4)\*b\*c)]

A(:,3)=[(-(m/4)\*a\*c);(-(m/4)\*c\*b);(m/3)\*((a^2)+(b^2))]

disp(A,"Momentum of Inertia tensor matrix for cube:")

[E,H]=spec(A)

Q=inv(E)

D=Q\*A\*E

disp(clean(D),"Diagonalized matrix:")

disp(H,"Eigenvalues of momennt of inertia matrix usinng spec command:")

disp(H(1,1),"Moment of innertia alonng x-axis:")

disp(H(2,2),"Moment of innertia alonng y-axis:")

disp(H(3,3),"Moment of innertia alonng z-axis:")

end

Outpuut:

for cube enter 1, for cuboid enter 2

i=2

Ennter the mass of the cube in kg=4

Enter length of side of the cuboid in meter=2

Enter breadth of side of the cuboid in meter=1

Enter height of side of the cuboid in meters=4

Momentum of Inertia tensor matrix for cube:

22.666667 -2. -8.

-2. 26.666667 -4.

-8. -4. 6.6666667

Diagonalized matrix:

2.5284151 0. 0.

0. 25.918708 0.

0. 0. 27.552877

Eigenvalues of momennt of inertia matrix usinng spec command:

2.5284151 0. 0.

0. 25.918708 0.

0. 0. 27.552877

Moment of innertia alonng x-axis:

2.5284151

Moment of innertia alonng y-axis:

25.918708

Moment of innertia alonng z-axis:

27.552877