Matlab-8

Determining the Energy Dissipation in an Asteroid Collision with Earth

Name: Om Ashish Mishra

Registration Number: 16BCE0789

DETERMINING THE ENERGY DISSIPATION IN AN ASTEROID COLLISION WITH EARTH

Experiment 8 (17/10/2016)

Aim:

Find the volume of the solid given by z=srqt(1-(x^2)-(y^2)) i.e. the upper hemisphere of the unit sphere centered at origin. View the figure through matlab.

New commands:

viewSolid: Plots the 3-D region bounded by the surfaces when y-limits are functions of x and x-limits are constant.

viewSolidone: Plots the 3-D region bounded by the surfaces when x-limits are functions of y and y-limits are constant.

Isa: Determine if input is object of specified class. Generally used to control conditional execution of commands.

The code:

```
clc
clearvars
close all
syms x y z
zlim = input('Enter the z?limits as [z0 z1]: '); % z0 is lower- and z1 is
upper-surface
ylim = input('Enter the y?limits as [y0 y1]: '); % y-limits may be function
or constant
xlim = input('Enter the x?limits as [x0 x1]: '); % x-limits may be constant
or function
if isa(ylim, 'sym')
vol = int(int(int(1,z,zlim(1),zlim(2)),y,ylim(1),ylim(2)),x,xlim(1),xlim(2));
viewSolid(z,zlim(1)+0*x*y,zlim(2)+0*x*y,y,ylim(1)+0*x,ylim(2)+0*x,x,xlim(1),x
lim(2));
else
vol = int(int(int(1,z,zlim(1),zlim(2)),x,xlim(1),xlim(2)),y,ylim(1),ylim(2));
viewSolidone(z,zlim(1)+0*x*y,zlim(2)+0*x*y,x,xlim(1)+0*y,xlim(2)+0*y,y,ylim(1
),ylim(2));
end
disp(['The volume of the solid is: ', char(vol)]);
```

Input:

```
Command Window
New to MATLAB? See resources for Getting Started.
Enter the z?limits as [z0 z1]: [0 sqrt(1-x^2-y^2)]
Enter the y?limits as [y0 y1]: [-sqrt(1-x^2) sqrt(1-x^2)]
Enter the x?limits as [x0 x1]: [-1 1]
```

Output:

```
Command Window
Enter the z-limits as [z0 z1]: [0 sqrt(1-x^2-y^2)]
Enter the y-limits as [y0 y1]: [-sqrt(1-x^2) sqrt(1-x^2)]
Enter the x-limits as [x0 x1]: [-1 1]
The volume of the solid is: (2*pi)/3
>>
```

The Graph: