



SNS COLLEGE OF TECHNOLOGY

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UNIT V

OPENGL Quadric and Cubic Surface Functions

A number of other three-dimensional quadric-surface objects can be displayed using functions that are included in the OpenGL Utility Toolkit (GLUT) and in the OpenGL Utility (GLU).

> With the GLUT functions, we can display a sphere, cone, torus, or a teapot

> With the GLU functions, we can display a sphere, cylinder, tapered cylinder, cone, flat circular ring, and a section of a circular ring.

GLUT Quadric Functions

Sphere

Function:

`glutWireSphere (r, nLongitudes, nLatitudes);`

or

`glutSolidSphere (r, nLongitudes, nLatitudes);`

where,

> r is sphere radius which is double precision point.

> nLongitudes and nLatitudes is number of longitude and latitude lines used to approximate the sphere.

Cone

Function:

`glutWireCone (rBase, height, nLongitudes, nLatitudes);`

or

`glutSolidCone (rBase, height, nLongitudes, nLatitudes);`

where,

- > rBase is the radius of cone base which is double precision point.
- > height is the height of cone which is double precision point.
- > nLongitudes and nLatitudes are assigned integer values that specify the number of orthogonal surface lines for the quadrilateral mesh approximation.

Cone

Torus

Function:

glutWireTorus (rCrossSection, rAxial, nConcentrics, nRadialSlices);

or

glutSolidTorus (rCrossSection, rAxial, nConcentrics, nRadialSlices);

where,

- > rCrossSection radius about the coplanar z axis
- > rAxialis the distance of the circle center from the z axis
- > nConcentrics specifies the number of concentric circles to be used on the torus surface,
- > nRadialSlices specifies the number of radial slices through the torus surface

Torus

GLUT Cubic Functions : Teapot

Cubic

Function:

glutWireTeapot (size);

or

glutSolidTeapot (size);

- > The teapot surface is generated using OpenGL B´ezier curve functions.
- > Parameter size sets the double-precision floating-point value for the maximum radius of the teapot bowl.

> The teapot is centered on the world-coordinate origin with its vertical axis along the y axis

GLU Quadric Surface Functions

GLU Functions

To generate a quadric surface using GLU functions

1. assign a name to the quadric,
2. activate the GLU quadric renderer, and
3. designate values for the surface parameters

The following statements illustrate the basic sequence of calls for displaying a wire frame sphere centered on the world-coordinate origin:

```
GLUQuadricObj *sphere1;  
  
sphere1 = gluNewQuadric( );  
  
gluQuadricDrawStyle (sphere1, GLU_LINE);  
  
gluSphere (sphere1, r, nLongitudes, nLatitudes);
```

> sphere1 is the name of the object

> The quadric renderer is activated with the gluNewQuadric function, and then the display mode GLU_LINE is selected for sphere1 with gluQuadricDrawStyle command

> Parameter r is assigned a double-precision value for the sphere radius

> nLongitudes and nLatitudes : number of longitude lines and latitude lines.

Where,

Three other display modes are available for GLU quadric surfaces

> GLU_POINT: quadric surface is displayed as point plot

> GLU_SILHOUETTE: quadric surface displayed will not contain shared edges between two

coplanar polygon facets

> GLU_FILL: quadric surface is displayed as patches of filled area.

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