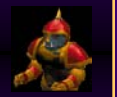
Texture Coordinate Generation

Michael I. Gold

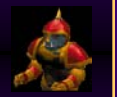
NVIDIA Corporation



glTexGen

Powerful, flexible, underutilized

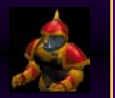
- Contour mapping
- Reflection mapping
- Lighting effects
- Atmospheric effects



glTexGen (cont'd)

Generate texture coordinates from geometry

- Object space
  - texture is "attached" to object
- Eye space
  - object moves within texture "field"
- Sphere map
  - based on reflection vector



Reference Plane

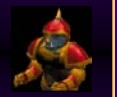
Uses plane equation

- Ax + By +Cz = D

Computes dot product

- coord = Ax + By + Cz + Dw
- coord is distance from plane

Computation is “seperable”



Object Linear Mapping

Texture is "attached" to object

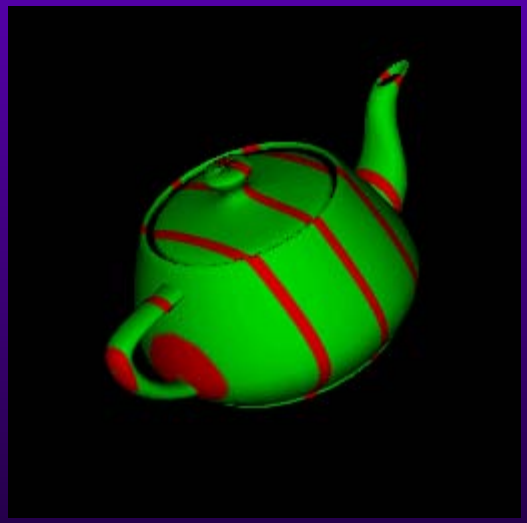
```
GLfloat params = {A,B,C,D};
glTexGenfv(GL_S, GL_OBJECT_PLANE,
  params);
glTexGeni(GL_S, GL_TEXTURE_GEN_MODE,
  GL_OBJECT_LINEAR);
glEnable(GL_TEXTURE_GEN_S);
```

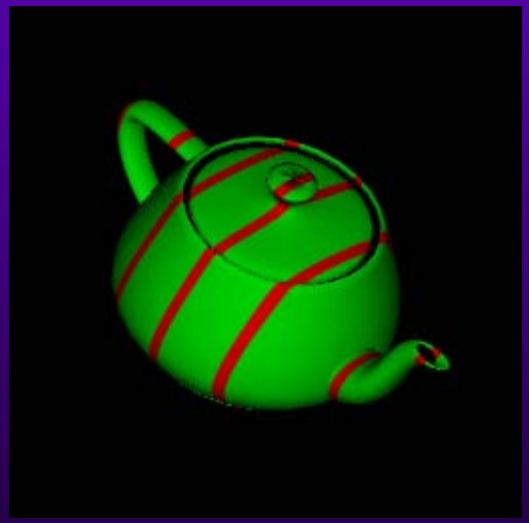
Default mapping is identity

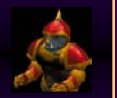
(s,t,r,q) = (Xo, Yo, Zo, Wo);

Object Linear Sample

Texture is “attached” to object



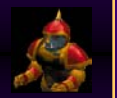




Eye Linear Mapping

Texture is "fixed" in eye space

```
GLfloat params = {A,B,C,D};
glTexGenfv(GL_S, GL_EYE_PLANE, params);
glTexGeni(GL_S, GL_TEXTURE_GEN_MODE,
  GL_EYE_LINEAR);
glEnable(GL_TEXTURE_GEN_S);
```

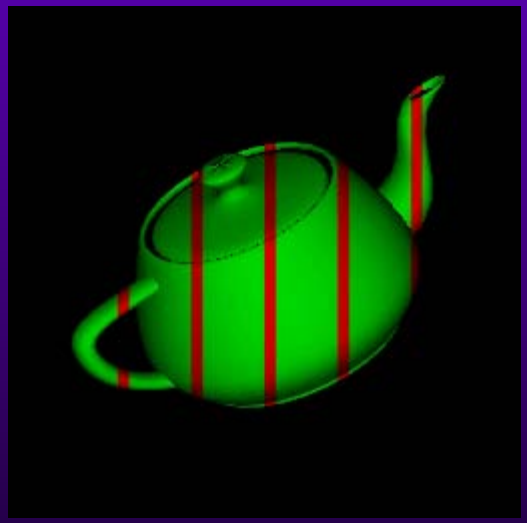


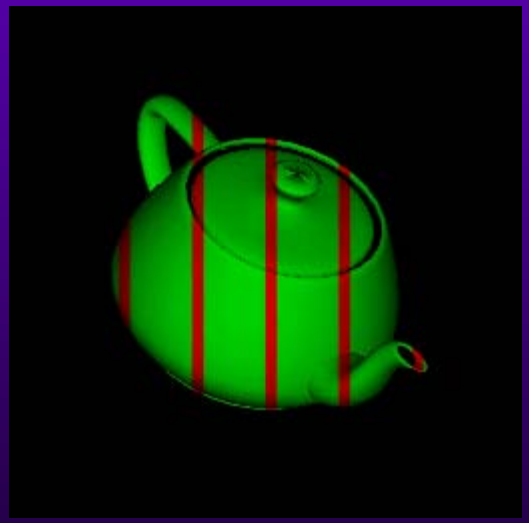
Default mapping is identity

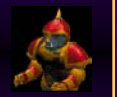
(s,t,r,q) = (Xe, Ye, Ze, We);

Eye Linear Sample

Texture is “fixed” in eye space





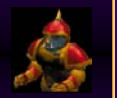


Sphere Mapping

Based on reflection vector

```
glTexGeni(GL_S, GL_TEXTURE_GEN_MODE,
  GL_SPHERE_MAP);
glEnable(GL_TEXTURE_GEN_S);
```

S, T coordinates only



Sphere Mapping

Based on reflection vector