Drawing 3D: Coordinates

CSCI 4229/5229
Computer Graphics
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Lorenz Observations

- Compute coordinates or store?
  - Readability over efficiency
- The attractor does not fit in (-1,+1)
  - Transform coordinates
- The attractor should remain the same when viewed from different positions
  - Recompute from fixed position or store
- Avoid IO (read or write)
  - Bad for performance in display
  - Bad user interface anywhere else

The Issue

- Lorenz attractor (x,y,z) values are generally in the range (-50,50) in all three dimensions
- How do you get OpenGL to display the whole range of values?
- Assume
  - Lorenz values are in an array x[i],y[i][z[i], i=0,...,n-1
  - double *dim* is defined somewhere as 50

Option 1

```
void display()
{...
   for (i=0;i<n;i++)
        glVertex3d(x[i]/dim , y[i]/dim , z[i]/dim);
...}
```

Option 2

```
void display()
{...
   for (i=0;i<n;i++)
        glVertex4d(x[i] , y[i] , z[i] , dim);
...}
```

Option 3

```
void display()
{...
   glScaled(1/dim , 1/dim , 1/dim);
   for (i=0;i<n;i++)
       glVertex3d(x[i] , y[i] , z[i]);
...}
```

Option 4

```
void display()
{...
   for (i=0;i<n;i++)
        glVertex3d(x[i] , y[i] , z[i]);
...}
void reshape()
{...
    glScaled(1/dim , 1/dim , 1/dim);
...}
```

Option 5

```
void display()
{...
   for (i=0;i<n;i++)
        glVertex3d(x[i] , y[i] , z[i]);
...}
void reshape()
{...
    glOrtho(-asp*dim,asp*dim,-dim,dim,-dim,dim);
...}
```