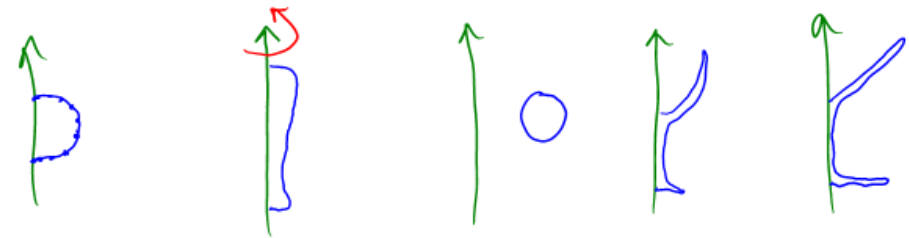


Surfaces of Revolution

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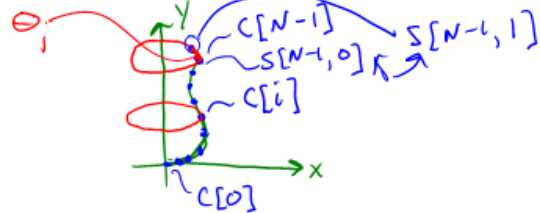
Surfaces of revolution



Idea: rotate a 2D **profile curve** around an axis.

What kinds of shapes can you model this way?

Constructing surfaces of revolution



Given: A set of points $C[i]$ on a curve in the xy -plane:

$$C[i] = \begin{bmatrix} C_x[i] \\ C_y[i] \\ 0 \\ 1 \end{bmatrix} \quad \text{where } i \in [0, N-1]$$

Let $R_y(\theta)$ be a rotation about the y -axis ^{by} angle θ .

Find: A set of points $S[i, j]$ on the surface formed by rotating $C[i]$ rotated about the y -axis. Assume $j \in [0, M-1]$.

Solution:

$$S[i, j] = R_y(\theta) C[i]$$

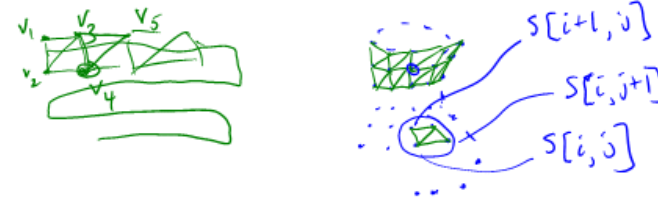
$$= R_y\left(j \frac{2\pi}{M}\right) C[i]$$

$$\theta_j = \frac{2\pi}{M} j$$

$$\theta_j = j \frac{2\pi}{M}$$

Constructing surfaces of revolution

We now have an array of points, $S[i, j]$ on the surface.



How would we turn this into a mesh of triangles?

How many triangles are generated? $2MN$

How would we send the triangles to the graphics card?

Direct on graphics card as a "shader" program

```
glDrawElement
glBegin[GL_TRIANGLE_STRIP]
glVertex[...]
```