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:

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

Let $R_y(\Theta_j)$ be a rotation about the $y$-axis by angle $\Theta_j$.

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:

$$S[i,j] = R_y(\Theta_j)C[i] = R_y[j\frac{2\pi}{M}]C[i]$$

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

```gl
glDrawElements

glBegin[GL_TRIANGLES]
vertices

```