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 yz-plane

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

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

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

Solution:

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