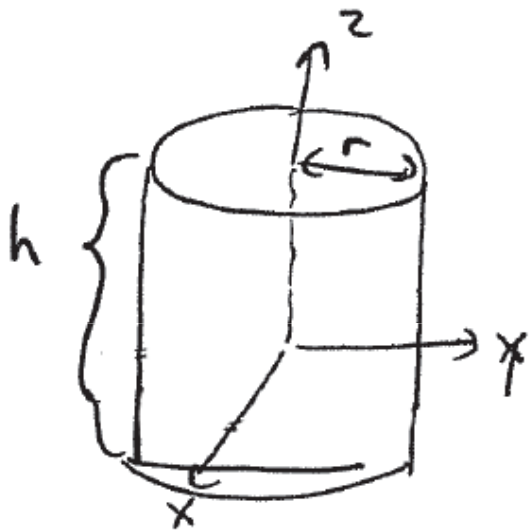CS 428: Fall 2009

Introduction to Computer Graphics
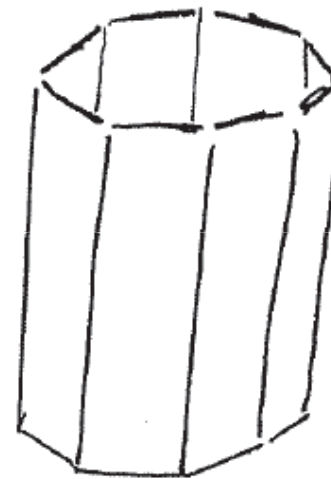
Polygonal meshes
(continued)

Meshes from smooth surfaces

Tessellation

$x = r \cos u$

$y = r \sin u$

$z = h v$

$u \in [0, 2\pi)$

$v \in [0, 1]$

open tube

Meshes from smooth surfaces

Tessellation

$$S(u,v) = \begin{bmatrix} r \cos u \\ r \sin u \\ h v \end{bmatrix}$$

approx.

apply s to vertices

$0 \quad \frac{\pi}{2} \quad \pi \quad \frac{3\pi}{2} \quad 2\pi$
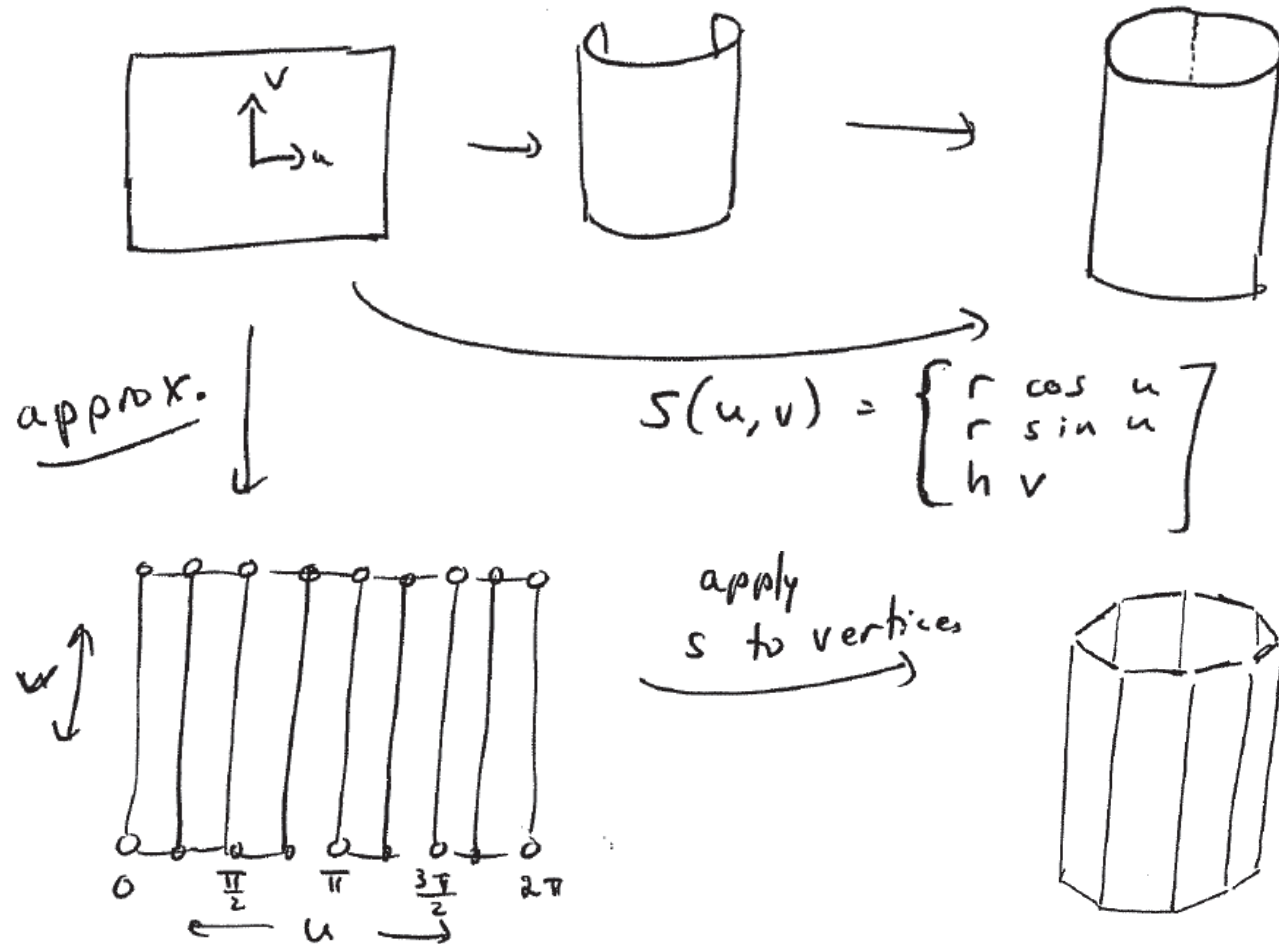
Meshes from smooth surfaces

Tessellation

- What about the seam?
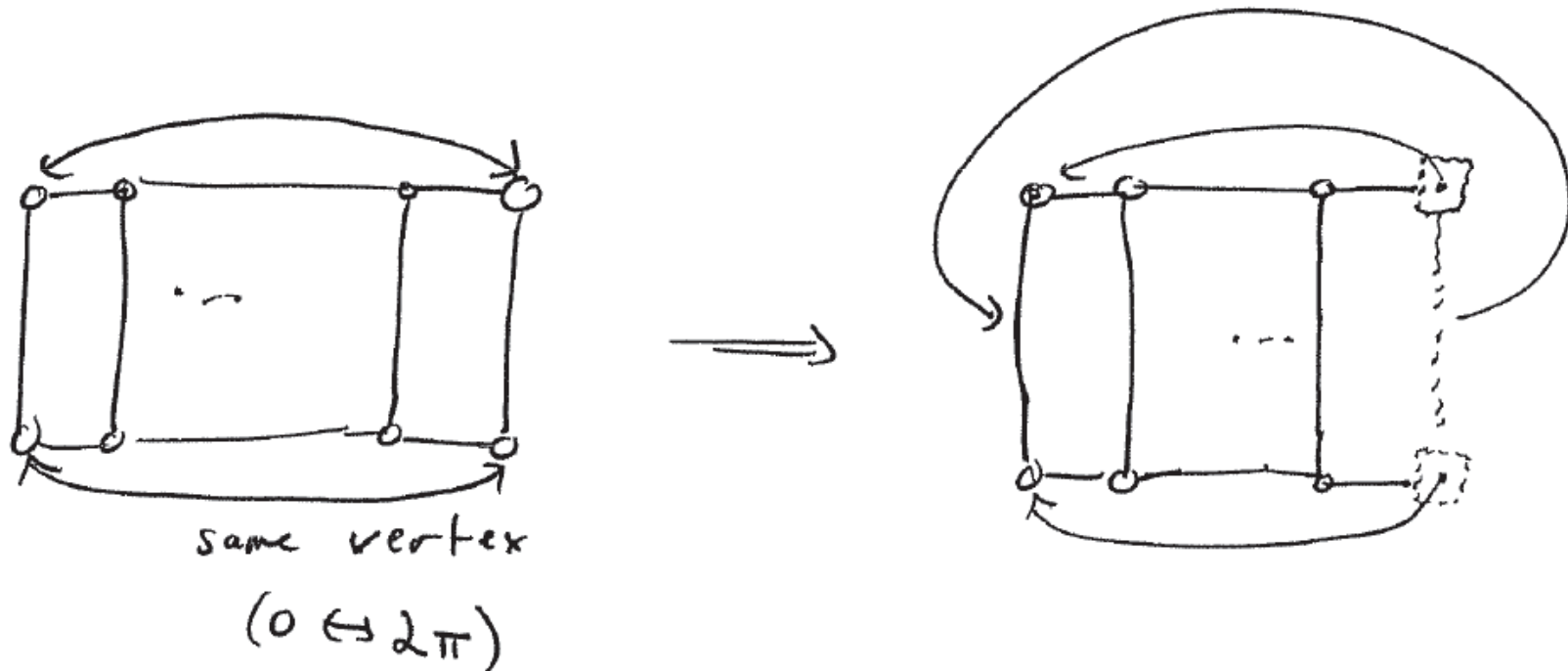
same vertex

$$(0 \leftrightarrow 2\pi)$$

Meshes from smooth surfaces

Tessellation

- This can get much more complicated
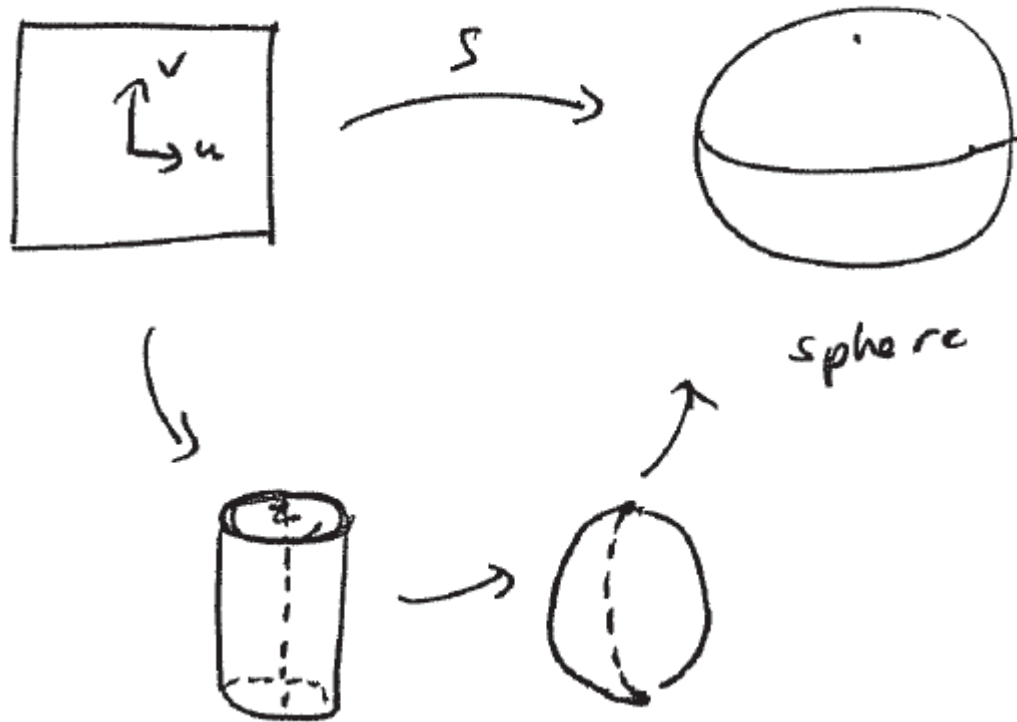
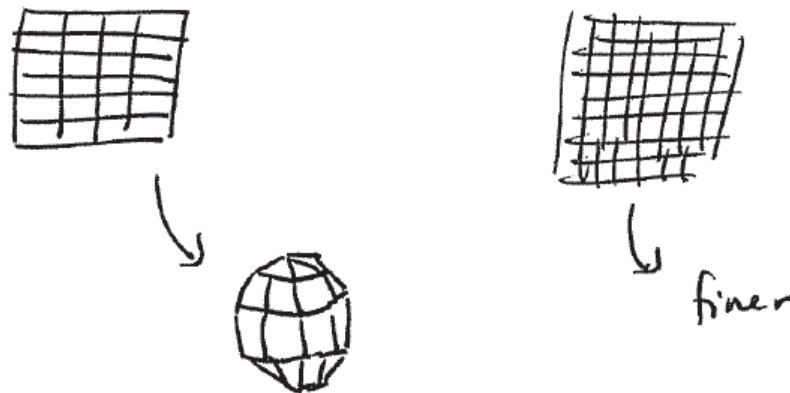$$S(u,v) = \begin{bmatrix} a_x \cos u \cos v \\ a_y \sin u \cos v \\ a_z \sin v \end{bmatrix}$$

can be r_1, r_2, r_3

sphere

$u \in [0, 2\pi)$ long.

$v \in [-\frac{\pi}{2}, \frac{\pi}{2}]$ lat.

Meshes from smooth surfaces

Tessellation

■ This can get much more complicated

Tessellation resolution

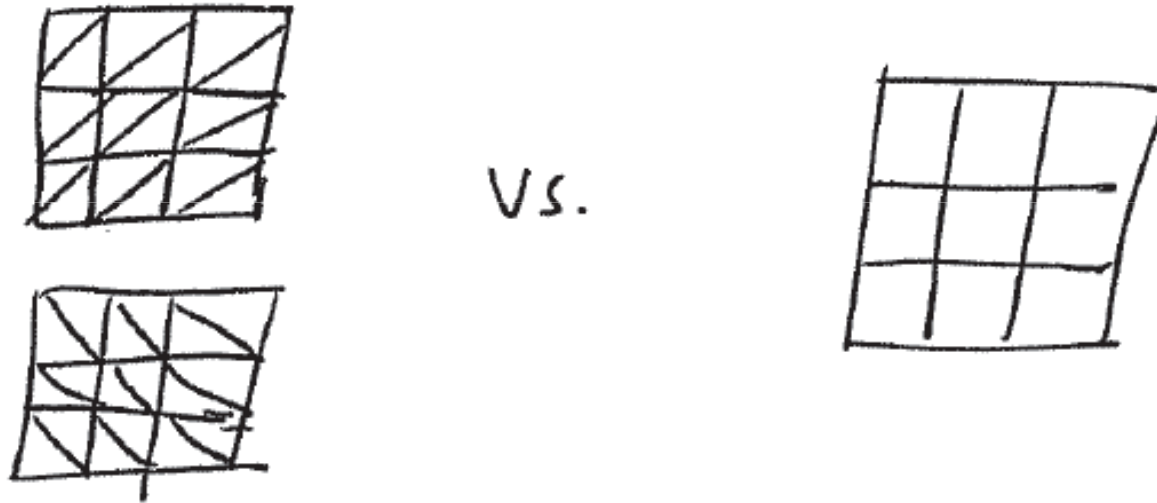- How many points to use?

circle → polygon circle

- How many faces ↔ how fine is the uv grid

finer

Tessellation resolution

- Triangles vs. quadrilaterals

Vs.

- Triangles always planar
- Some triangles collapse in sphere

- Not always planar
- Sometimes better for surface modeling

Next time…

- On Wednesday (10/7)
    - polygon illumination
    - Local lighting models
    - Empirical shading models
    - **Project 2** will be available online (due **10/28**)