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Project #4

Loop subdivision

due: 12-4

Implement Loop subdivision surfaces. You will get data sets in due course.

There was a missing equation in class on how to compute new vertex points. Here it comes:

For each vertex $\mathbf{v}^i$ in the mesh, form a new vertex point $\mathbf{v}^{i+1}$. Assuming $\mathbf{v}^i$ has n neighbors $vv_1^i, \ldots, \mathbf{v}_n^i$ it is computed as follows:

$$\mathbf{v}^{i+1} = (1 - n\alpha)\mathbf{v}^i + \alpha \sum_{j=1}^{n} vv_j^i \tag{1}$$

where

$$\alpha = \frac{1}{n}\left(\frac{5}{8} - \left(\frac{3}{8} + \frac{1}{4}\cos\frac{2\pi}{n}\right)^2\right]$$

for $n > 3$ and $\alpha = \frac{3}{16}$ if $n = 3$.