

## Polyhedra

This category displays the five Platonic solids (tetrahedron, hexahedron (or cube), octahedron, dodecahedron, and icosahedron) both in their regular (Platonic) forms, and their truncated (Archimedean) versions.

Truncation cuts off the same portion of the facet centered at each vertex by a plane orthogonal to the line from the center to that vertex. The degree of truncation is controlled by the parameter  $aa$ . When  $aa$  is 1 (or greater) there is no truncation and the polyhedron is regular. When  $aa$  is  $1/2$  (or less) every facet is completely cut off. The value  $aa = 2/3$  gives the standard Archimedean truncation, characterized by the fact that all its edges have equal length.

Perhaps the most famous of the Archimedean polyhedra is the Buckyball, which is the truncated icosahedron. For this reason it is given a special entry on the Polyhedron menu.

The choice of a polyhedron is made in the Regular submenu of the Polyhedron menu. When one of the five regular solids is chosen, it is immediately displayed. Choosing “Create Truncated” from the

Polyhedron menu will display the Archimedean truncation of the solid. Of course, choosing “Set Parameters...” from the Settings menu and giving  $aa$  a value different from its default value of  $2/3$  will produce a different degree of truncation. Choosing Create from the Polyhedron menu will go back to the Platonic version of the solid.

Choosing Morph from the Animation menu will produce a filmstrip of the solid being truncated from its Platonic to its Archimedean version. If you choose Set Morphing... from the Settings menu and give  $a1$  the value  $1/2$  instead of  $2/3$ , Morphing will produce a filmstrip of the facets being cut off completely.

While developing the algorithms for truncation I received advice, help, and encouragement from Fan Chung, Han Sah, Darko Babic, and Igor Rivin, and I would like to thank them all.