

Kepler Polyhedra and Planets

Frank Dodd Smith, Jr. - 2016

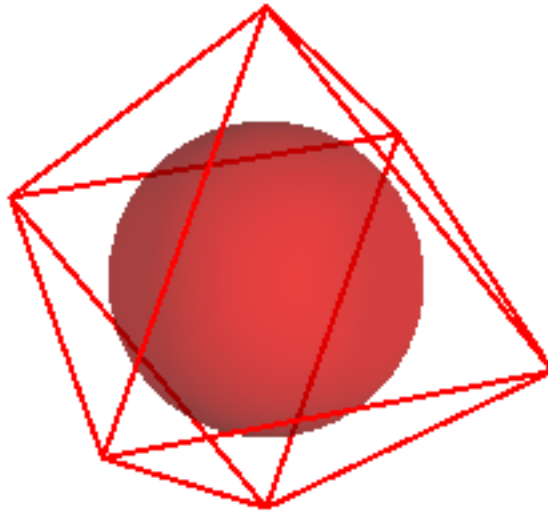
(images other than 24-cell are from, or adapted from, Wikipedia and Wolfram MathWorld)

Abstract

This is my view of extension to Uranus and Neptune
of Kepler's *Mysterium Cosmographicum* idea
of relationship of Polytopes and Planetary Orbits

Mercury = Outer Sun-Sphere = **Inner Octahedron**

Octahedron = 6 space Axes

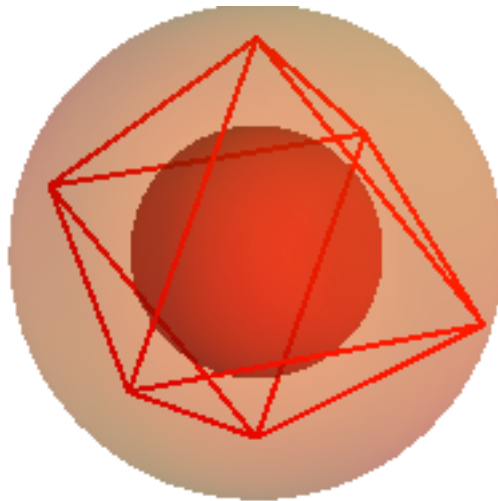


Venus / Mercury = 0.72 / 0.39 = 1.85

$$\text{Octahedron Outer / Inner} = \sqrt{3} / 1 = \frac{a}{2} \sqrt{2} \approx 0.707 \cdot a \quad / \quad \frac{a}{6} \sqrt{6} \approx 0.408 \cdot a = 1.732$$

Venus = **Outer Octahedron** = Inner Icosahedron

Icosahedron = 12 Golden Edge-Points of Octahedron

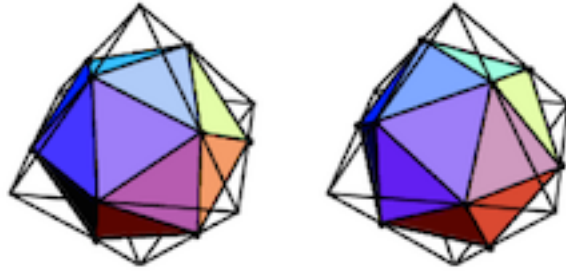


$$\text{Earth / Venus} = 1 / 0.72 = 1.39$$

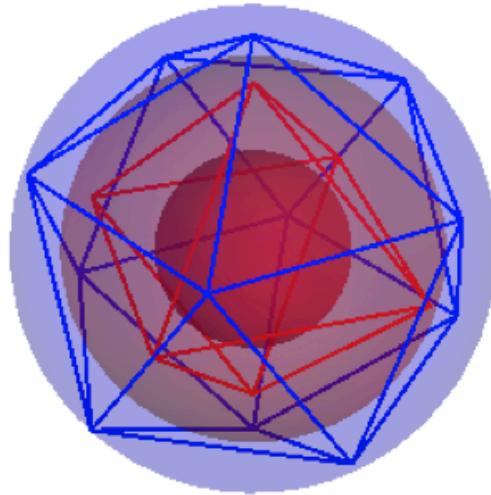
$$\text{Icosahedron Outer / Inner} = \frac{a}{2} \sqrt{\phi\sqrt{5}} = \frac{a}{4} \sqrt{10 + 2\sqrt{5}} = a \sin \frac{2\pi}{5} \approx 0.9510565163 \cdot a \quad \Bigg/ \quad \frac{\phi^2 a}{2\sqrt{3}} = \frac{\sqrt{3}}{12} (3 + \sqrt{5}) a \approx 0.7557613141 \cdot a \approx 1.26$$

Earth = **Outer Icosahedron** = Inner Dodecahedron

Icosahedron = 2 Octahedral embeddings = Earth + Moon



Dodecahedron = Dual Icosahedron



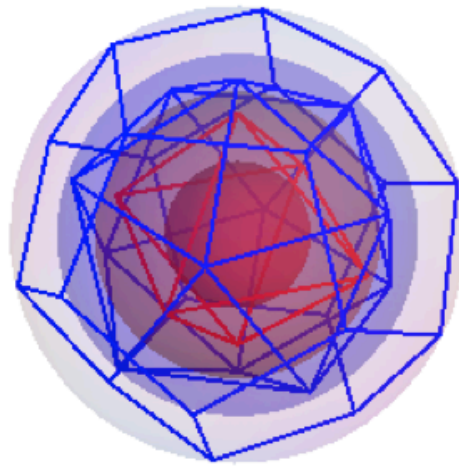
Mars / Earth = 1.52 / 1 = 1.52

$$\text{Dodecahedron Outer / Inner} = \frac{\sqrt{3}}{4} (1 + \sqrt{5}) \approx 1.401\,258\,538 \quad / \quad \frac{1}{2} \sqrt{\frac{5}{2} + \frac{11}{10} \sqrt{5}} \approx 1.113\,516\,364 \approx 1.26$$

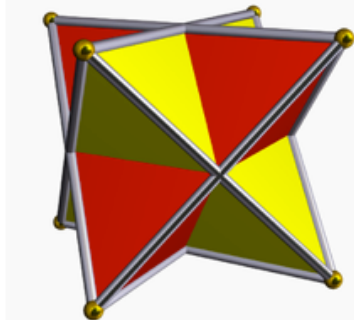
Since Earth+Moon has 2 Outer Icosahedra, use $1.26 \times 1.26 = 1.59$

Mars = **Outer Dodecahedron** = Inner Tetrahedron

Tetrahedron = 4 / 20 of Dodecahedron Vertices



Tetrahedron = self-dual => stellated octahedron => unstable = Asteroids

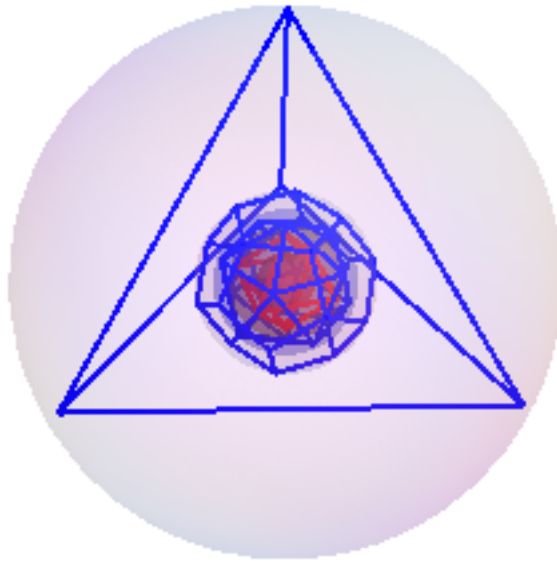


$$\text{Jupiter / Mars} = 5.2 / 1.52 = 3.42$$

$$\text{Tetrahedron Outer / Inner} = \sqrt{\frac{3}{8}} a \bigg/ \frac{a}{\sqrt{24}} = 3$$

Jupiter = **Outer Tetrahedron** = Inner Cube

Cube = 2 Tetrahedron Vertices = Dual Octahedron

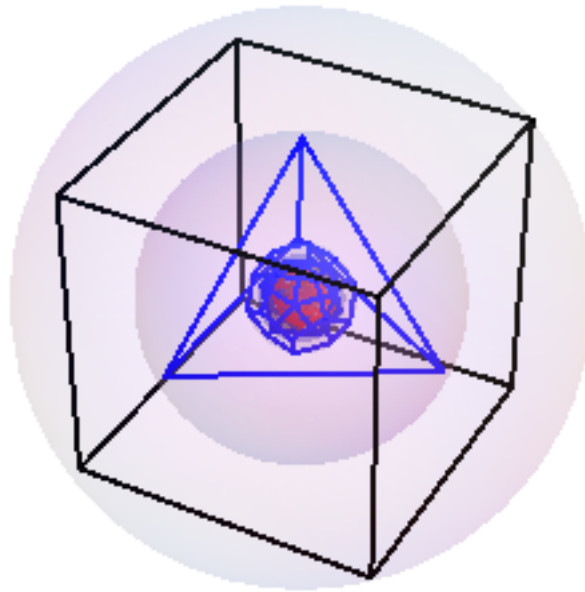


$$\text{Saturn} / \text{Jupiter} = 9.54 / 5.20 = 1.83$$

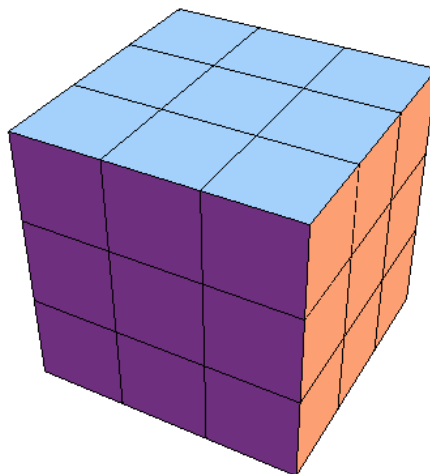
$$\text{Cube Outer} / \text{Inner} = \frac{\sqrt{3}}{2} a \quad / \quad \frac{a}{2} = \sqrt{3} = 1.732$$

Saturn = **Outer Cube** = Inner CubOctahedron

Cuboctahedron = Truncated Cube



Poincare Gravity Space = Tiled by Cube



Uranus / Saturn = 19.19 / 9.54 = 2.01

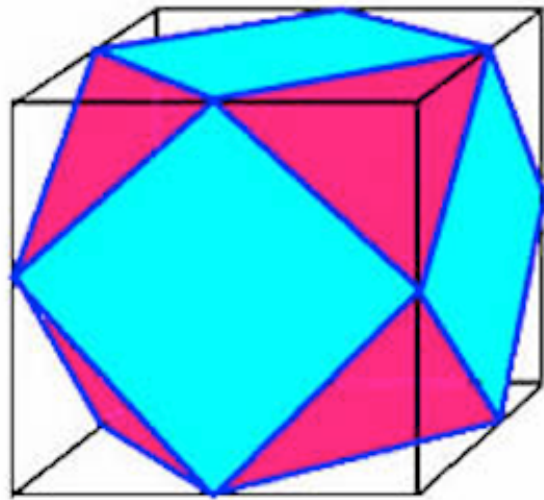
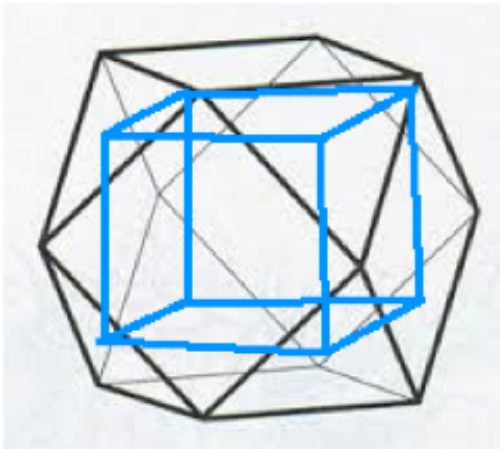
$$\text{CubOctahedron Outer (dilated by Basic Cube Edge / CubOcta Edge) / Inner (square face)} = \sqrt{2} / \frac{1}{2} \sqrt{2} = 2$$

Uranus = **Outer CubOctahedron** = Inner Rhombic Dodecahedron

Rhombic Dodecahedron = Dual Cuboctahedron

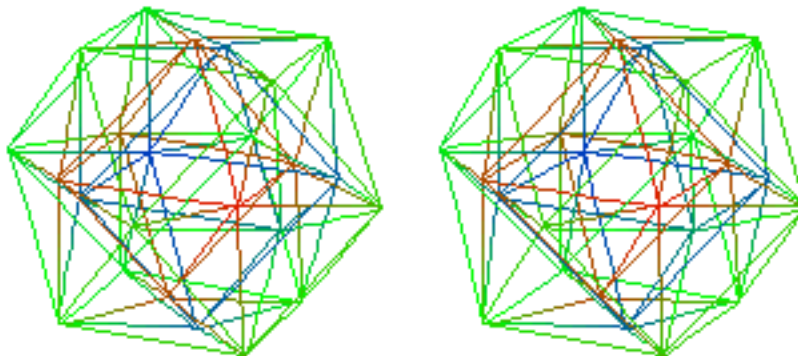
Cuboctahedron containing Cube of centers of Triangle Faces and

Cuboctahedron within Basic Cube prior to Truncation



Uranus Orbit = Boundary of Pioneer Conformal Gravity Dark Energy

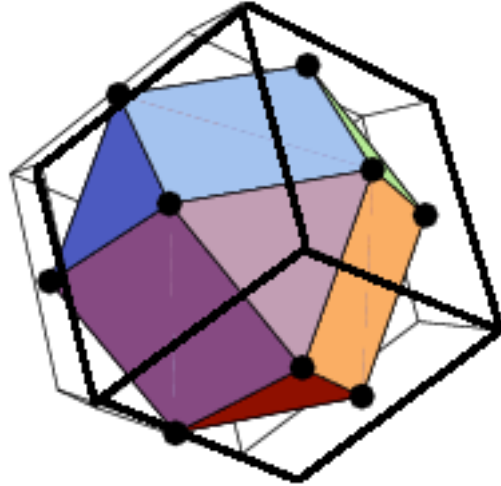
Cuboctahedron = Buckminster Fuller Vector Equilibrium = Center of 4-dim 24-cell



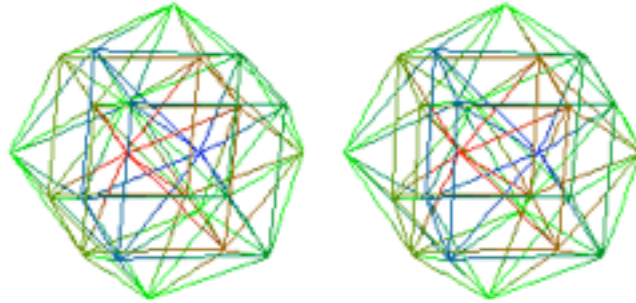
Neptune / Uranus= 30.06 / 19.19 = 1.57

$$\text{Rhombic Dodecahedron Outer / Inner} = \frac{2\sqrt{3}}{3}a \approx 1.154700538a \quad / \quad \frac{\sqrt{6}}{3}a \approx 0.8164965809a = \sqrt{2} = 1.414$$

Neptune = **Outer Rhombic Dodecahedron** = Inner Conformal Gravity Space



Rhombic Dodecahedron = Center of 4-dim 24-cell



Conformal Gravity Space = Tiled by Rhombic Dodecahedra

