Sky tesselation

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I. ICOSAHEDRON

The vertices of an icosahedron centered at the origin and with circumradius 1 are:

$$V_1 = (0, 0, 1) \tag{1a}$$
$$V_2 = (0, 0, -1) \tag{1b}$$
$$V_3 = \left(\frac{2}{\sqrt{5}}, 0, \frac{1}{\sqrt{5}}\right) \tag{1c}$$
$$V_4 = \left(-\frac{2}{\sqrt{5}}, 0, -\frac{1}{\sqrt{5}}\right) \tag{1d}$$
$$V_5 = \left(-\frac{5+\sqrt{5}}{10}, \sqrt{\frac{5-\sqrt{5}}{10}}, \frac{1}{\sqrt{5}}\right) \tag{1e}$$
$$V_6 = \left(-\frac{5+\sqrt{5}}{10}, -\sqrt{\frac{5-\sqrt{5}}{10}}, \frac{1}{\sqrt{5}}\right) \tag{1f}$$
$$V_7 = \left(\frac{5+\sqrt{5}}{10}, \sqrt{\frac{5-\sqrt{5}}{10}}, -\frac{1}{\sqrt{5}}\right) \tag{1g}$$
$$V_8 = \left(\frac{5+\sqrt{5}}{10}, -\sqrt{\frac{5-\sqrt{5}}{10}}, -\frac{1}{\sqrt{5}}\right) \tag{1h}$$
$$V_9 = \left(\frac{5-\sqrt{5}}{10}, \sqrt{\frac{5+\sqrt{5}}{10}}, \frac{1}{\sqrt{5}}\right) \tag{1i}$$
$$V_{10} = \left(\frac{5-\sqrt{5}}{10}, -\sqrt{\frac{5+\sqrt{5}}{10}}, \frac{1}{\sqrt{5}}\right) \tag{1j}$$
$$V_{11} = \left(-\frac{5-\sqrt{5}}{10}, \sqrt{\frac{5+\sqrt{5}}{10}}, -\frac{1}{\sqrt{5}}\right) \tag{1k}$$
$$V_{12} = \left(-\frac{5-\sqrt{5}}{10}, -\sqrt{\frac{5+\sqrt{5}}{10}}, -\frac{1}{\sqrt{5}}\right) \tag{1l}$$

II. ORTHOGRAPHIC PROJECTION

III. CONSTRUCTING FINER TESSELATIONS

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