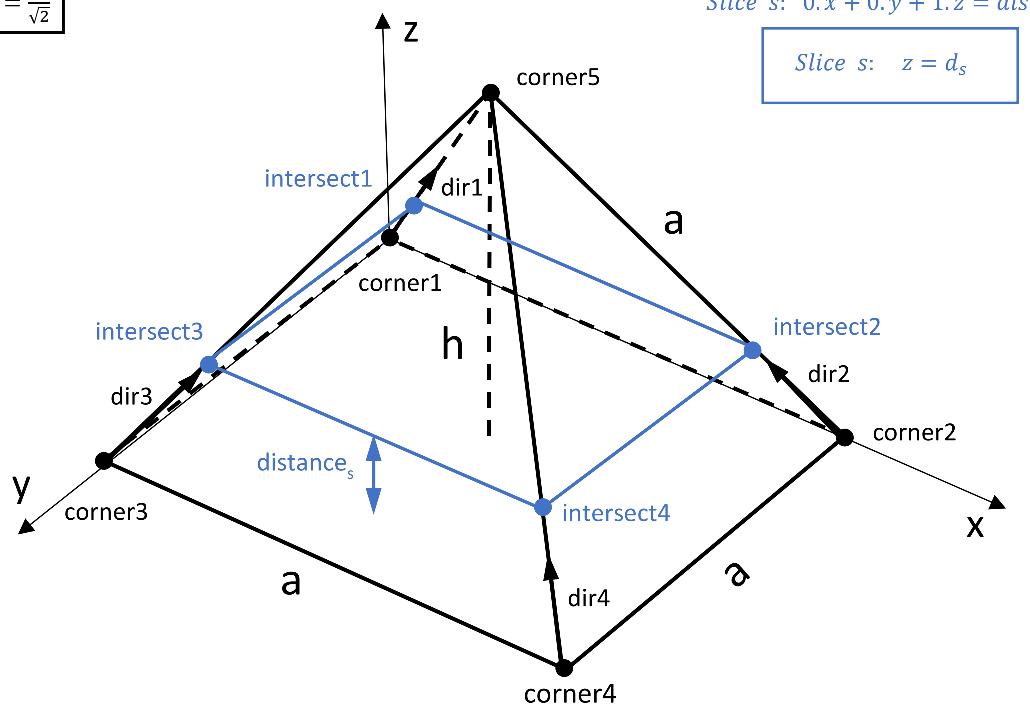
height $h = \frac{a}{\sqrt{2}}$

Slice s: $0.x + 0.y + 1.z = distance_s$

Slice s: $z = d_s$



$$corner1 = \vec{c_1} = \begin{pmatrix}0\\0\\0\end{pmatrix} \quad corner2 = \vec{c_2} = \begin{pmatrix}a\\0\\0\end{pmatrix} \quad corner3 = \vec{c_3} = \begin{pmatrix}0\\a\\0\end{pmatrix} \quad corner4 = \vec{c_4} = \begin{pmatrix}a\\a\\0\end{pmatrix} \quad corner5 = \vec{c_5} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix}$$

$$dir1 = \vec{e_1} = \vec{c_5} - \vec{c_1} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} - \begin{pmatrix}0\\0\\0\end{pmatrix} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} \qquad dir2 = \vec{e_2} = \vec{c_5} - \vec{c_2} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} - \begin{pmatrix}a\\0\\0\end{pmatrix} = \begin{pmatrix}-a/2\\a/2\\a/\sqrt{2}\end{pmatrix}$$

$$dir3 = \vec{e_3} = \vec{c_5} - \vec{c_3} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} - \begin{pmatrix}0\\a\\0\end{pmatrix} = \begin{pmatrix}a/2\\-a/2\\a/\sqrt{2}\end{pmatrix} \qquad dir4 = \vec{e_4} = \vec{c_5} - \vec{c_4} = \begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} - \begin{pmatrix}a\\a\\0\end{pmatrix} = \begin{pmatrix}-a/2\\-a/2\\a/\sqrt{2}\end{pmatrix}$$

$$line1 = \vec{c_1} + k_1\vec{e_1} = \begin{pmatrix}0\\0\\0\end{pmatrix} + k_1\begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} \qquad line2 = \vec{c_2} + k_2\vec{e_2} = \begin{pmatrix}a\\0\\0\end{pmatrix} + k_2\begin{pmatrix}-a/2\\a/2\\a/\sqrt{2}\end{pmatrix}$$

$$line3 = \vec{c_3} + k_3\vec{e_3} = \begin{pmatrix}0\\a\\0\end{pmatrix} + k_3\begin{pmatrix}a/2\\-a/2\\a/\sqrt{2}\end{pmatrix} \qquad line4 = \vec{c_4} + k_4\vec{e_4} = \begin{pmatrix}a\\a\\0\end{pmatrix} + k_4\begin{pmatrix}-a/2\\-a/2\\a/\sqrt{2}\end{pmatrix}$$

$$intersect1: \quad c_{1,z} + k_1 e_{1,z} = \left(0 + k_1 a/\sqrt{2}\right) = d_s \;\rightarrow\; k_1 = \tfrac{\sqrt{2}}{a} d_s$$

$$intersect2: \quad c_{2,z} + k_2 e_{2,z} = \left(0 + k_2 a/\sqrt{2}\right) = d_s \;\rightarrow\; k_2 = \tfrac{\sqrt{2}}{a} d_s$$

$$intersect3: \quad c_{3,z} + k_3 e_{3,z} = \left(0 + k_3 a/\sqrt{2}\right) = d_s \;\rightarrow\; k_3 = \tfrac{\sqrt{2}}{a} d_s$$

$$intersect4: \quad c_{4,z} + k_4 e_{4,z} = \left(0 + k_4 a/\sqrt{2}\right) = d_s \;\rightarrow\; k_4 = \tfrac{\sqrt{2}}{a} d_s \;\rightarrow\; \boxed{k = \tfrac{\sqrt{2}}{a} d_s}$$

$$intersect1 = \vec{p_1} = \begin{pmatrix}0\\0\\0\end{pmatrix} + k\begin{pmatrix}a/2\\a/2\\a/\sqrt{2}\end{pmatrix} \qquad intersect2 = \vec{p_2} = \begin{pmatrix}a\\0\\0\end{pmatrix} + k\begin{pmatrix}-a/2\\a/2\\a/\sqrt{2}\end{pmatrix}$$

$$intersect3 = \vec{p_3} = \begin{pmatrix}0\\a\\0\end{pmatrix} + k\begin{pmatrix}a/2\\-a/2\\a/\sqrt{2}\end{pmatrix} \qquad intersect4 = \vec{p_4} = \begin{pmatrix}a\\a\\0\end{pmatrix} + k\begin{pmatrix}-a/2\\-a/2\\a/\sqrt{2}\end{pmatrix}$$