$$P_0 = [\, P_{0x}, P_{0y}, P_{0z} \,]$$
$$\vec{n_0} = [\, n_{0x}, n_{0y}, n_{0z} \,]$$
$$\vec{b_0} = [\, b_{0x}, b_{0y}, b_{0z} \,]$$

$$V_0 = P_0 + \alpha(-\vec{n_0} + \vec{b_0})$$
$$V_1 = P_0 + \alpha(\vec{n_0} + \vec{b_0})$$
$$V_2 = P_0 + \alpha(\vec{n_0} - \vec{b_0})$$
$$V_3 = P_0 + \alpha(-\vec{n_0} - \vec{b_0})$$

Note that $\vec{b_0}$ and $\vec{n_0}$ are on the same plane as $V_0, V_1, V_2, V_3$