1.2.16

$$P = (P_x, P_y, P_z)$$

$$up = \frac{P}{|P|} \qquad \text{From } 15$$

$$x = (x_1, x_2, x_3), \quad y = (y_1, y_2, y_3)$$
$$x \cdot y = x_1 y_1 + x_2 y_2 + x_3 y_3$$

$$up \cdot i = \frac{P_1}{|P|}, \frac{P_2}{|P|}, \frac{P_3}{|P|}) \cdot (1,0,0) = \frac{P_1}{|P|}$$

$$up \cdot j = \frac{P_1}{|P|}, \frac{P_2}{|P|}, \frac{P_3}{|P|}) \cdot (0,1,0) = \frac{P_2}{|P|}$$

$$up \cdot k = \frac{P_1}{|P|}, \frac{P_2}{|P|}, \frac{P_3}{|P|}) \cdot (0,0,1) = \frac{P_3}{|P|}$$

$$P = |P| \cdot \cos \theta$$

$$\cos^2 \theta_1 + \cos^2 \theta_2 + \cos^2 \theta_3 = 1$$

Replace $P = up$ z equations lead to 1

$$\cos^2 \theta_1 = \frac{P_1}{|P|}, \quad \cos^2 \theta_2 = \frac{P_2}{|P|}, \quad \cos^2 \theta_3 = \frac{P_3}{|P|}$$

$$P = (P_x, P_y, P_z) = |P|(\cos \theta_1, \cos \theta_2, \cos \theta_3)$$