

HM #3
20-21C 600A
cool per

$$\gamma = \cos^{-1} \left(\frac{\vec{e} \cdot \vec{R}}{eR} \right) = \cos^{-1} \left(\frac{-0.4855\hat{i} + 0.1206\hat{j} - 0.00046\hat{k} \cdot -6.533\hat{i} + 1.570\hat{j} + 4.2\hat{k}}{5.003 \cdot 6.719 \cdot 1.3} \right) \approx 97.49^\circ$$

$$\vec{v} \cdot \vec{R} = \sqrt{v_x^2 + v_y^2 + v_z^2} \cdot R = v$$

$$\vec{e} \cdot \vec{R} = \sqrt{e_x^2 + e_y^2 + e_z^2} \cdot R = R$$

$$\vec{v} \cdot \vec{R} = \frac{v_x R_x + v_y R_y + v_z R_z}{R} = \frac{0.00046 \cdot 6.533 - 0.1206 \cdot 1.570 + 0.4855 \cdot 4.2}{6.719 \cdot 1.3} = 0$$

$$\vec{v} \cdot \vec{v} = v^2 = \frac{v_x^2 + v_y^2 + v_z^2}{R^2} = \frac{0.00046^2 + 0.1206^2 + 0.4855^2}{6.719^2 \cdot 1.3^2} = \frac{0.2408}{45.14} = 0.0053$$

$$\vec{e} \cdot \vec{e} = 1 = \frac{e_x^2 + e_y^2 + e_z^2}{R^2} = \frac{6.533^2 + 1.570^2 + 4.2^2}{6.719^2 \cdot 1.3^2} = \frac{45.14}{45.14} = 1$$

$$\vec{v} \times \vec{v} = \vec{0}$$

$$\vec{e} \times \vec{e} = \vec{0}$$

$$\vec{v} \times \vec{e} = \vec{n} \quad \left(\frac{\vec{v} \cdot \vec{e}}{v e} \right)^{1/2} \cos \theta = 1$$

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