

$$1. \cos^2 \theta + \cos^2 \beta + \cos^2 \gamma = 1$$

$$\cos^2 \beta = 1 - \cos^2 \theta - \cos^2 \gamma$$

$$\cos \beta = \sqrt{1 - \cos^2 \theta - \cos^2 \gamma}$$

$$\cos \beta = \pm 0.707 \quad \beta = 45^\circ \text{ or } 135^\circ$$

$$F = F \cos \theta \vec{i} + F \cos \beta \vec{j} + F \cos \gamma \vec{k}$$

$$500 (\cos 120^\circ + \cos 135^\circ + \cos 60^\circ)$$

$$= -250 \vec{i} - 354 \vec{j} + 250 \vec{k}$$

$$2. U_{EB} = \frac{(0-4)\vec{i} + (2-5)\vec{j} + (0-(-2))\vec{k}}{\sqrt{(0-4)^2 + (2-5)^2 + (0-(-2))^2}}$$

$$\sqrt{(0-4)^2 + (2-5)^2 + (0-(-2))^2}$$

$$= -0.9428 \vec{i} - 0.5591 \vec{j} + 0.3714 \vec{k}$$

$$U_{EB} = -\vec{j}$$

$$F = F U_{EB} = 600 (-0.9428 \vec{i} - 0.5591 \vec{j} + 0.3714 \vec{k})$$

$$= -445.66 \vec{i} - 334.25 \vec{j} + 222.83 \vec{k}$$

$$F_{ED} = F U_{ED} = (-445.66 \vec{i} - 334.25 \vec{j} + 222.83 \vec{k}) \times (-\vec{j})$$

$$= 334.25 \hat{=} 334 \text{ (N)}$$

$$F_{ED} = \sqrt{(600)^2 - (334.25)^2} = 498 \text{ (N)}$$

$$\text{合力}^2 = x \text{ 方向分量}^2 + y \text{ 方向分量}^2 \Rightarrow \sqrt{\text{合力}^2 - x \text{ 方向分量}^2} = y \text{ 方向分量}$$