STATICS
Vector Algebra
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Question: Determine whether the forces $\mathbf{F}_1 = 2\mathbf{i} + 3\mathbf{j} + 6\mathbf{k}$ and $\mathbf{F}_2 = 1.6\mathbf{i} + 2.4\mathbf{j} + 4.8\mathbf{k}$ are perpendicular, parallel or intersecting each other.

Solution:

If the resultant force obtained by the cross product is zero, it means the forces are parallel to each other or one of the forces is equal to zero,

$$\mathbf{F}_1 \times \mathbf{F}_2 = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ 2 & 3 & 6 \\ 1.6 & 2.4 & 4.8 \end{vmatrix}$$

$$\mathbf{F}_1 \times \mathbf{F}_2 = (3 \times 4.8 - 6 \times 2.4)\mathbf{i} - (2 \times 4.8 - 6 \times 1.6)\mathbf{j} + (2 \times 2.4 - 3 \times 1.6)\mathbf{k} = 0$$

If the resultant force obtained by the dot product $\mathbf{F}_1 \cdot \mathbf{F}_2$ is zero, it means the forces are perpendicular to each other or one of the forces is equal to zero.