正式课-Homework 4-19

Note: The **cross product a×b** of two vectors **a** and **b**, unlike the dot product, is a vector. For this reason it called the **vector product**. Note that **a×b** is defined only when **a** and **b** are *three-dimensional* vector $(a_1, a_2, a_3) = a_1\vec{i} + a_2\vec{j} + a_3\vec{k}$ and $\boldsymbol{b} = (b_1, b_2, b_3) = b_1\vec{i} + b_2\vec{j} + b_3\vec{k}$, then

$$\boldsymbol{a}\times\boldsymbol{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix}$$

Theorem The vector $\boldsymbol{a}\times\boldsymbol{b}$ is orthogonal to both **a** and **b**.

Theorem If θ is the angle between **a** and **b**(so $0 \le \theta \le \pi$),then $|\boldsymbol{a}\times\boldsymbol{b}| = |\boldsymbol{a}||\boldsymbol{b}|\boldsymbol{sin\theta}$

1. Find a line equation that passes through the point $M_0(2,4,0)$ and is parallel to the line L_2: $\begin{cases} x + 2z - 1 = 0 \\ y - 3z - 2 = 0 \end{cases}$

2. Find a line equation that passes through the point $\mathrm{P}(4,-1,3)$ and is parallel to the line $\frac{\mathrm{x}-3}{3} = \frac{y}{1} = \frac{z-1}{5}$.

3. Find symmetric equations and parametric equations of the line $\begin{cases} x - y + z = 1 \\ 2x + y + z = 4 \end{cases}$.