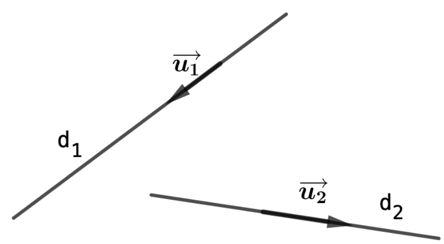
THE ANGLE BETWEEN TWO LINES

DANIEL SITARU - ROMANIA

Let be the lines:

$$d_1 : \begin{cases} x = 2 + t \\ y = 3 + 2t \\ z = 1 + 3t \end{cases} ; \qquad d_2 : \begin{cases} x = 3 + t \\ y = 1 + 3t \\ z = 4 + 2t \end{cases}$$



$$d_1 : \begin{cases} x - 2 = t \\ \frac{y-3}{2} = t \\ \frac{z-1}{3} = t \end{cases} ; \qquad d_2 : \begin{cases} x - 3 = t \\ \frac{y-1}{3} = t \\ \frac{z-4}{2} - t \end{cases} ; \qquad t \in \mathbb{R}$$

$$d_1 : \frac{x-2}{1} = \frac{y-3}{2} = \frac{z-1}{3}; d_2 : \frac{x-3}{1} = \frac{y-1}{3} = \frac{z-4}{2}$$

$$\overrightarrow{u_1}(1,2,3) = \overrightarrow{i} + 2\overrightarrow{j} + 3\overrightarrow{k}$$

$$u_2(1,3,2) = \overrightarrow{i} + 3\overrightarrow{j} + 2\overrightarrow{k}$$

$$\overrightarrow{u_1} \cdot \overrightarrow{u_2} = 1 \cdot 1 + 2 \cdot 3 + 3 \cdot 2 = 13$$

$$|\overrightarrow{u_1}| = \sqrt{1^2 + 2^2 + 3^2} = \sqrt{14}$$

$$|\overrightarrow{u_2}| = \sqrt{1^2 + 3^2 + 2^2} = \sqrt{14}$$

$$\cos(\angle(\overrightarrow{u_1}, \overrightarrow{u_2})) = \frac{\overrightarrow{u_1} \cdot \overrightarrow{u_2}}{|\overrightarrow{u_1}| \cdot |\overrightarrow{u_2}|} = \frac{13}{\sqrt{14} \cdot \sqrt{14}} = \frac{13}{14}$$

$$\mu(\angle(\overrightarrow{u_1}, \overrightarrow{u_2})) = \arccos\left(\frac{13}{14}\right)$$

Mathematics Department, National Economic College "Theodor Costescu", Drobeta Turnu - Severin, Romania

Email address: dansitaru63@yahoo.com