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Opgave 497

$$a: 5x - 3y + z + 12 = 0$$
$$b: -x + 8y - 3z - 4 = 0$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} x_0 + r_x t \\ y_0 + r_y t \\ z_0 + r_z t \end{pmatrix}$$

$$v_0 = \vec{0}$$
$$r = \vec{0}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} t \\ t \\ t \end{pmatrix}$$

$$5 \cdot (t) - 3y + z + 12 = 0 \qquad -(t) + 8y - 3z - 4 = 0$$
$$z = -5t + 3y - 12 \qquad -3z = t - 8y + 4$$
$$-3z = 15t - 9y + 36 \qquad -3z = t - 8y + 4$$

$$t - 8y + 4 = 15t - 9y + 36$$
$$y = 14t + 32$$

$$z = -5t + 3y - 12$$
$$z = -5t + 3(14t + 32) - 12$$
$$z = -5t + 42t + 96 - 12$$
$$z = 37t + 84$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 0 + 1t \\ 32 + 14t \\ 84 + 37t \end{pmatrix}$$

$$5x - 3y + z + 12 = 0$$
$$5x = 3y - z - 12$$
$$x = \frac{3y - z - 12}{5}$$

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Find vinklen mellem planerne

$$\overrightarrow{n_1} = \begin{pmatrix} 5 \\ -3 \\ 1 \end{pmatrix}$$
$$\overrightarrow{n_2} = \begin{pmatrix} -1 \\ 8 \\ -3 \end{pmatrix}$$

Find normalvektorer for hver plan, ud fra normalformlen

$$\left|\vec{V}\right| = \sqrt{x^2 + y^2 + z^2}$$

$$|\overrightarrow{n_1}| = \sqrt{5^2 + (-3)^2 + 1^2}$$
$$|\overrightarrow{\mathrm{n}_2}| = 5{,}91608$$

$$|\overrightarrow{n_2}| = \sqrt{(-1)^2 + 8^2 + (-3)^2}$$
$$|\overrightarrow{n_2}| = 8{,}602325$$

$$v = \cos^{-1}\left(\frac{x_1 \cdot x_2 + y_1 \cdot y_2 + z_1 \cdot z_2}{|\overrightarrow{n_1}| \cdot |\overrightarrow{n_2}|}\right)$$
$$v = \cos^{-1}\left(\frac{5 \cdot (-1) + (-3) \cdot 8 + 1 \cdot (-3)}{5.9 \cdot 8.60}\right) = 129$$