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Opgave 497

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

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

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

$$v_0 = \vec{0}$$

$$r = \vec{0}$$

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

$$5 \cdot (t) - 3y + z + 12 = 0 \quad - (t) + 8y - 3z - 4 = 0$$

$$z = -5t + 3y - 12 \quad - 3z = t - 8y + 4$$

$$-3z = 15t - 9y + 36 \quad - 3z = t - 8y + 4$$

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

$$y = 14t + 32$$

$$z = -5t + 3y - 12$$

$$z = -5t + 3(14t + 32) - 12$$

$$z = -5t + 42t + 96 - 12$$

$$z = 37t + 84$$

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

$$5x - 3y + z + 12 = 0$$

$$5x = 3y - z - 12$$

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

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Find vinklen mellem planerne

$$\vec{n}_1 = \begin{pmatrix} 5 \\ -3 \\ 1 \end{pmatrix}$$

$$\vec{n}_2 = \begin{pmatrix} -1 \\ 8 \\ -3 \end{pmatrix}$$

Find normalvektorer for hver plan, ud fra normalformlen

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

$$|\vec{n}_1| = \sqrt{5^2 + (-3)^2 + 1^2}$$

$$|\vec{n}_1| = 5,91608$$

$$|\vec{n}_2| = \sqrt{(-1)^2 + 8^2 + (-3)^2}$$

$$|\vec{n}_2| = 8,602325$$

$$v = \cos^{-1} \left(\frac{x_1 \cdot x_2 + y_1 \cdot y_2 + z_1 \cdot z_2}{|\vec{n}_1| \cdot |\vec{n}_2|} \right)$$

$$v = \cos^{-1} \left(\frac{5 \cdot (-1) + (-3) \cdot 8 + 1 \cdot (-3)}{5,9 \cdot 8,60} \right) = 129$$