Normalform in Parameterform

1.

$$E:\left[\vec{x}-\begin{pmatrix}2\\1\\0\end{pmatrix}\right]\cdot\begin{pmatrix}3\\1\\-5\end{pmatrix}=0$$

$$\begin{pmatrix}x\\y\\z\end{pmatrix}\cdot\begin{pmatrix}3\\1\\-5\end{pmatrix}-\begin{pmatrix}2\\1\\0\end{pmatrix}\cdot\begin{pmatrix}3\\1\\-5\end{pmatrix}=0$$

$$\begin{pmatrix}x\\y\\z\end{pmatrix}\cdot\begin{pmatrix}3\\1\\-5\end{pmatrix}=\begin{pmatrix}2\\1\\0\end{pmatrix}\cdot\begin{pmatrix}3\\1\\-5\end{pmatrix}$$

$3x+y-5z=2\cdot3+1\cdot1+0\cdot(-5)$

$3x+y-5z=7$, Koordform

$3x+y-5z=7\ |-3x/-y$

$-5z=7-3x-y\ |:(-5)$

$z=\frac{-7}{5}+\frac{3}{5}x+\frac{1}{5}y$, $(x=r,\ y=s)$

$$\begin{cases}z=1{,}4+0{,}6r+0{,}2s\\y=0+0r+1s\\x=0+1r+0s\end{cases}$$

$$\Rightarrow\begin{pmatrix}0\\0\\-1{,}4\end{pmatrix}+r\cdot\begin{pmatrix}1\\0\\0{,}6\end{pmatrix}+s\begin{pmatrix}0\\1\\0{,}2\end{pmatrix}$$

2.

$$E:\begin{pmatrix}4\\1\\4\end{pmatrix}\cdot\left[\begin{pmatrix}x\\y\\z\end{pmatrix}-\begin{pmatrix}2\\3\\-1\end{pmatrix}\right]=0$$

$$\begin{pmatrix}4\\1\\4\end{pmatrix}\cdot\begin{pmatrix}x\\y\\z\end{pmatrix}-\begin{pmatrix}4\\1\\4\end{pmatrix}\cdot\begin{pmatrix}2\\3\\-1\end{pmatrix}=0$$

$$\begin{pmatrix}4\\1\\4\end{pmatrix}\cdot\begin{pmatrix}x\\y\\z\end{pmatrix}=\underbrace{\begin{pmatrix}4\\1\\4\end{pmatrix}\cdot\begin{pmatrix}2\\3\\-1\end{pmatrix}}_{d}$$

$4x+1y+4z=4\cdot2+1\cdot3+4(-1)=7$

$4x+y+4z=7$, Koordi. Form

$4x+y+4z=7\ |-4x/-y$

$4z=7-4x-y\ |:(4)\quad(x=r,y=s)$

$$\begin{cases}z=\frac{7}{4}-1r-\frac{1}{4}s\\y=0+0r+1s\\x=0+1r+0s\end{cases}$$

$$\Rightarrow\begin{pmatrix}0\\0\\1{,}75\end{pmatrix}+r\cdot\begin{pmatrix}1\\0\\-1\end{pmatrix}+s\cdot\begin{pmatrix}0\\1\\-0{,}25\end{pmatrix}$$

3.

$$E:\begin{pmatrix}-10\\-3\\2\end{pmatrix}\cdot\left[\begin{pmatrix}x\\y\\z\end{pmatrix}-\begin{pmatrix}2\\3\\4\end{pmatrix}\right]=0$$

$$\begin{pmatrix}-10\\-3\\2\end{pmatrix}\cdot\begin{pmatrix}x\\y\\z\end{pmatrix}-\begin{pmatrix}-10\\-3\\2\end{pmatrix}\cdot\begin{pmatrix}2\\3\\4\end{pmatrix}=0$$

$$\begin{pmatrix}-10\\-3\\2\end{pmatrix}\cdot\begin{pmatrix}x\\y\\z\end{pmatrix}=\underbrace{\begin{pmatrix}-10\\-3\\2\end{pmatrix}\cdot\begin{pmatrix}2\\3\\4\end{pmatrix}}_{d}$$

$-10x-3y+2z=-10\cdot2+(-3)\cdot3+2\cdot4=7$

$-10x-3y+2z=7$, Koord. Form

$-10x-3y+2z=7\ |+10x/+3y$

$2z=7+10x+3y\ |:(2)\quad(x=r,y=s)$

$$\begin{cases}z=3{,}5+5r+1{,}5s\\y=0+0r+1s\\x=0+1r+0s\end{cases}$$

$$\Rightarrow\begin{pmatrix}0\\0\\3{,}5\end{pmatrix}+r\cdot\begin{pmatrix}1\\0\\5\end{pmatrix}+s\cdot\begin{pmatrix}0\\1\\1{,}5\end{pmatrix}$$