Lösung S.93/28b

Schnittpunkt von g und h berechnen:

$$\begin{pmatrix}5\\5\\9\end{pmatrix}+r\begin{pmatrix}2\\10\\11\end{pmatrix}=\begin{pmatrix}-3\\3\\-2\end{pmatrix}+s\begin{pmatrix}3\\-4\\0\end{pmatrix}$$

$$\begin{array}{llll}\text{(I)} & 2r & -3s & =-8\\ \text{(II)} & 10r & +4s & =-2\\ \text{(III)} & 11r & & =-11\end{array}$$

Aus (III): r = -1;
r in (II): 10(-1) + 4s = -2 $\Rightarrow$ s = 2
Zur Kontrolle r und s in (I): 2(-1) –3·2 = -8 Ok!

Schnittpunkt S: $\vec{S}=\begin{pmatrix}5\\5\\9\end{pmatrix}+(-1)\begin{pmatrix}2\\10\\11\end{pmatrix}=\begin{pmatrix}3\\-5\\-2\end{pmatrix}$

Richtungen der Winkelhalbierenden berechnen:

$$\vec{u}=\begin{pmatrix}2\\10\\11\end{pmatrix}\Rightarrow\vec{u}^{o}=\frac{\begin{pmatrix}2\\10\\11\end{pmatrix}}{\sqrt{\begin{pmatrix}2\\10\\11\end{pmatrix}^2}}=\frac{\begin{pmatrix}2\\10\\11\end{pmatrix}}{\sqrt{2^2+10^2+11^2}}=\frac{\begin{pmatrix}2\\10\\11\end{pmatrix}}{\sqrt{225}}=\frac{\begin{pmatrix}2\\10\\11\end{pmatrix}}{15};$$

$$\vec{v}=\begin{pmatrix}3\\-4\\0\end{pmatrix}\Rightarrow\vec{v}^{o}=\frac{\begin{pmatrix}3\\-4\\0\end{pmatrix}}{\sqrt{\begin{pmatrix}3\\-4\\0\end{pmatrix}^2}}=\frac{\begin{pmatrix}3\\-4\\0\end{pmatrix}}{\sqrt{3^2+4^2}}=\frac{\begin{pmatrix}3\\-4\\0\end{pmatrix}}{\sqrt{25}}=\frac{\begin{pmatrix}3\\-4\\0\end{pmatrix}}{5};$$

$$\vec{u}^{o}+\vec{v}^{o}=\frac{1}{15}\begin{pmatrix}2\\10\\11\end{pmatrix}+\frac{1}{5}\begin{pmatrix}3\\-4\\0\end{pmatrix}=\frac{1}{15}\begin{pmatrix}2\\10\\11\end{pmatrix}+\frac{1}{15}\begin{pmatrix}9\\-12\\0\end{pmatrix}=\frac{1}{15}\begin{pmatrix}11\\-2\\11\end{pmatrix}$$

$$\vec{u}^{o}-\vec{v}^{o}=\frac{1}{15}\begin{pmatrix}2\\10\\11\end{pmatrix}-\frac{1}{5}\begin{pmatrix}3\\-4\\0\end{pmatrix}=\frac{1}{15}\begin{pmatrix}2\\10\\11\end{pmatrix}-\frac{1}{15}\begin{pmatrix}9\\-12\\0\end{pmatrix}=\frac{1}{15}\begin{pmatrix}-7\\22\\11\end{pmatrix}$$

Winkelhalbierende:

$$w_1:\vec{X}=\vec{S}+t\begin{pmatrix}11\\-2\\11\end{pmatrix}=\begin{pmatrix}3\\-5\\-2\end{pmatrix}+t\begin{pmatrix}11\\-2\\11\end{pmatrix}$$

$$w_2:\vec{X}=\vec{S}+s\begin{pmatrix}-7\\22\\11\end{pmatrix}=\begin{pmatrix}3\\-5\\-2\end{pmatrix}+s\begin{pmatrix}-7\\22\\11\end{pmatrix}$$