5.1

R_{ZYX} (vgl. cg03_part3.pdf)

$$0{,}5 = -\sin\theta \Rightarrow \boxed{\theta = -30^\circ}$$

$$\frac{0{,}433}{0{,}75} = \tan\psi \Rightarrow \boxed{\psi = 30^\circ}$$

$$\frac{0{,}433}{0{,}75} = \tan\phi \Rightarrow \boxed{\phi = 30^\circ}$$

$$R_{ZYZ} = R_z(\phi)\, R_y(\psi)\, R_z(\theta)$$

$$= \begin{pmatrix} \cos\phi & -\sin\phi & 0 \\ \sin\phi & \cos\phi & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \cos\psi & 0 & \sin\psi \\ 0 & 1 & 0 \\ -\sin\psi & 0 & \cos\psi \end{pmatrix} \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} \lambda & 0 & -\lambda^3 \\ 0 & -1 & 0 \\ -\lambda^1 & 0 & -\lambda^4 \end{pmatrix} \qquad \lambda = \frac{\sqrt{2}}{2}$$

$^1\cos\psi = -\lambda \Rightarrow \psi = 135^\circ$

$^2 -\sin\psi\cos\theta = -\lambda \overset{\sin\psi = \frac{1}{\sqrt{2}}}{\Rightarrow} \cos\theta = 0{,}5 \Rightarrow \theta = 60^\circ$

$^3 \cos\phi\sin\psi = -\lambda \Rightarrow \cos\phi = -0{,}5 \Rightarrow \phi = 120^\circ$