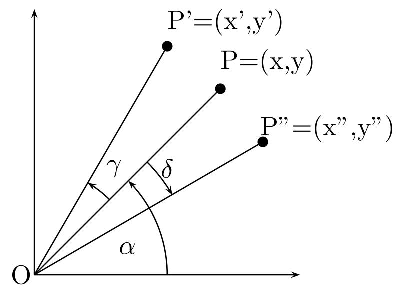
Forgatási transzformáció



Legyen $L = \sqrt{x^2+y^2} = \sqrt{x'^2+y'^2} = \sqrt{x''^2+y''^2} = \|\overrightarrow{OP}\| = \|\overrightarrow{OP'}\| = \|\overrightarrow{OP''}\|$.

$$\begin{aligned}
x^2+y^2 &= x'^2+y'^2 \\
&= (L\cdot\cos(\alpha+\gamma))^2 + (L\cdot\sin(\alpha+\gamma))^2 \\
&= (L\cdot(\cos(\alpha)\cos(\gamma)-\sin(\alpha)\sin(\gamma)))^2 + (L\cdot(\cos(\alpha)\sin(\gamma)+\sin(\alpha)\cos(\gamma)))^2 \\
&= (\underbrace{L\cdot\cos(\alpha)}_{x}\cos(\gamma) - \underbrace{L\cdot\sin(\alpha)}_{y}\sin(\gamma))^2 + (\underbrace{L\cdot\cos(\alpha)}_{x}\sin(\gamma) + \underbrace{L\cdot\sin(\alpha)}_{x}\cos(\gamma))^2 \\
&= (x\cdot\cos(\gamma) - y\cdot\sin(\gamma))^2 + (x\cdot\sin(\gamma)+y\cdot\cos(\gamma))^2 \\
&= \underbrace{(x\cdot\cos(\gamma) - y\cdot\sin(\gamma))^2}_{x'^2} + \underbrace{(x\cdot\sin(\gamma)+y\cdot\cos(\gamma))^2}_{y'^2}
\end{aligned}$$

$$x' = L\cdot\cos(\alpha+\gamma) = \underbrace{L\cdot\cos(\alpha)}_{x}\cos(\gamma) - \underbrace{L\cdot\sin(\alpha)}_{y}\sin(\gamma) = x\cdot\cos(\gamma) - y\cdot\sin(\gamma)$$

$$y' = L\cdot\sin(\alpha+\gamma) = \underbrace{L\cdot\cos(\alpha)}_{x}\sin(\gamma) + \underbrace{L\cdot\sin(\alpha)}_{y}\cos(\gamma) = x\cdot\sin(\gamma) + y\cdot\cos(\gamma)$$

$$x'' = L\cdot\cos(\alpha-\delta) = \underbrace{L\cdot\cos(\alpha)}_{x}\cos(-\delta) - \underbrace{L\cdot\sin(\alpha)}_{y}\sin(-\delta) = x\cdot\cos(-\delta) - y\cdot\sin(-\delta)$$

$$y'' = L\cdot\sin(\alpha-\delta) = \underbrace{L\cdot\cos(\alpha)}_{x}\sin(-\delta) + \underbrace{L\cdot\sin(\alpha)}_{y}\cos(-\delta) = x\cdot\sin(-\delta) + y\cdot\cos(-\delta)$$