12.3 $A(0,0)$, $B(3,0)$, $C(3,3)$, $D(0,3)$ pătrat

Determinați imaginea pătratului prin forfecarea de vector $\vec{v}(1,1)$, de unghi $60°$, relativ la origine

$$Shear(Q,\vec{w},\theta)=\begin{pmatrix} 1-w_1w_2\,tg\theta & w_1^2\,tg\theta & (q_1w_1w_2-q_2w_1^2)\,tg\theta \\ -w_2^2\,tg\theta & 1+w_1w_2\,tg\theta & (q_1w_2^2-q_2w_1w_2)\,tg\theta \\ 0 & 0 & 1 \end{pmatrix}$$

$Q=O(0,0)$ $\vec{w}=\dfrac{\vec{v}}{\|\vec{v}\|}=\left(\dfrac{1}{\sqrt{2}},\dfrac{1}{\sqrt{2}}\right)$, $tg\theta=tg\,60°=\sqrt{3}$

$$Shear(O,\vec{w},60°)=\begin{pmatrix} 1-\dfrac{\sqrt{3}}{2} & \dfrac{\sqrt{3}}{2} & 0 \\ -\dfrac{\sqrt{3}}{2} & 1+\dfrac{\sqrt{3}}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$[ABCD]=\begin{pmatrix} 0 & 3 & 3 & 0 \\ 0 & 0 & 3 & 3 \\ 1 & 1 & 1 & 1 \end{pmatrix}$$

$$[A'B'C'D']=Shear(O,\vec{w},60°)\cdot[ABCD]$$

$$=\begin{pmatrix} 1-\dfrac{\sqrt{3}}{2} & \dfrac{\sqrt{3}}{2} & 0 \\ -\dfrac{\sqrt{3}}{2} & 1+\dfrac{\sqrt{3}}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}\cdot\begin{pmatrix} 0 & 3 & 3 & 0 \\ 0 & 0 & 3 & 3 \\ 1 & 1 & 1 & 1 \end{pmatrix}$$

$$=\begin{pmatrix} 0 & 3-\dfrac{3\sqrt{3}}{2} & 3 & \dfrac{3\sqrt{3}}{2} \\ 0 & -\dfrac{3\sqrt{3}}{2} & 3 & 3+\dfrac{3\sqrt{3}}{2} \\ 1 & 1 & 1 & 1 \end{pmatrix}$$

$A'(0,0)$ $C'(3,3)$

$B'\left(3-\dfrac{3\sqrt{3}}{2},-\dfrac{3\sqrt{3}}{2}\right)$ $D'\left(\dfrac{3\sqrt{3}}{2},3+\dfrac{3\sqrt{3}}{2}\right)$