



$$\mathbf{v}_{\text{new}} = \mathbf{T}\mathbf{R}\mathbf{v}$$

unit vectors!!  $\mathbf{u} = [u_x, u_y]$

orthogonal  $\mathbf{v} = [v_x, v_y]$

$$\mathbf{R} = \begin{bmatrix} u_x & v_x & 0 & 0 \\ u_y & v_y & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

(assumption: we are working with homogeneous coordinates)  
We want to obtain the transformation shown above. You already know how to compute the translation  $\mathbf{T}$ , but what about rotation? This can be done by constructing a rotation matrix as shown in the slide. **Note {u,v} need to be normalized and orthogonal to each other!!!**