3D Computer Vision - Task 0-2 notes

Lab session materials for subjects B4M33TDV, BE4M33TDV, XP33VID

Martin Matoušek

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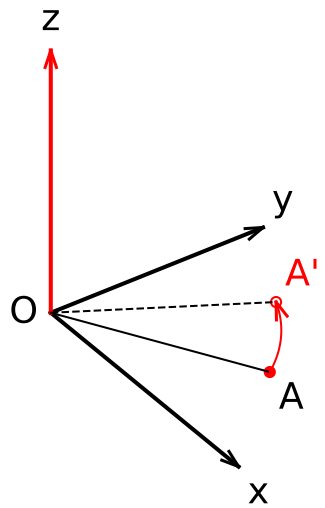
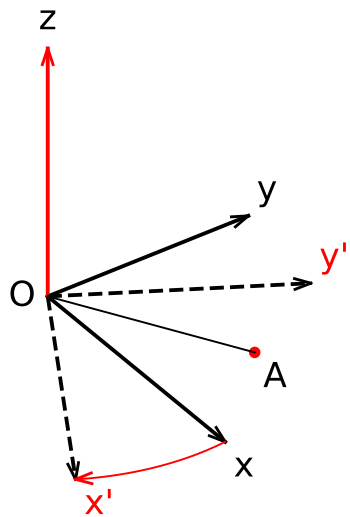
CENTER FOR MACHINE
PERCEPTION

Positive rotation direction convention: curl right hand rule (thumb = rotation axis, fingers = direction)
this is for rotating a point coordinates:

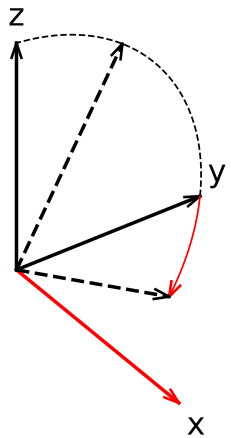
$$\boldsymbol{A}' = \mathbf{R}\boldsymbol{A}$$



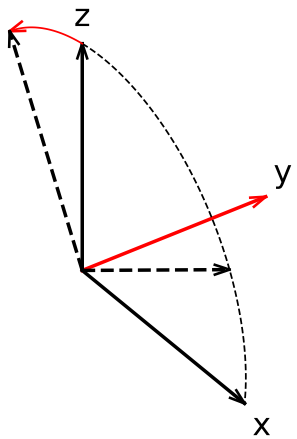
Base is rotated in the opposite direction:
vector $\overrightarrow{\boldsymbol{O}\boldsymbol{A}'}$ in (x, y, z) base has the same coordinates as $\overrightarrow{\boldsymbol{O}\boldsymbol{A}}$ in (x', y', z) base.



$$\mathbf{R}_x(\alpha) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos(\alpha) & -\sin(\alpha) \\ 0 & \sin(\alpha) & \cos(\alpha) \end{bmatrix}$$



$$\mathbf{R}_y(\alpha) = \begin{bmatrix} \cos(\alpha) & 0 & \sin(\alpha) \\ 0 & 1 & 0 \\ -\sin(\alpha) & 0 & \cos(\alpha) \end{bmatrix}$$



$$\mathbf{R}_z(\alpha) = \begin{bmatrix} \cos(\alpha) & -\sin(\alpha) & 0 \\ \sin(\alpha) & \cos(\alpha) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$