Werk Nr / Job No	2D- 3 axis	Bladsy Nr / Page No	1 van / of 1
Projek / Project	Kinematics	Datum / Date	24-6-21
Bereken deur / Calculated by	RdP	Nagesien / Checked	SA-CNC-CLUB

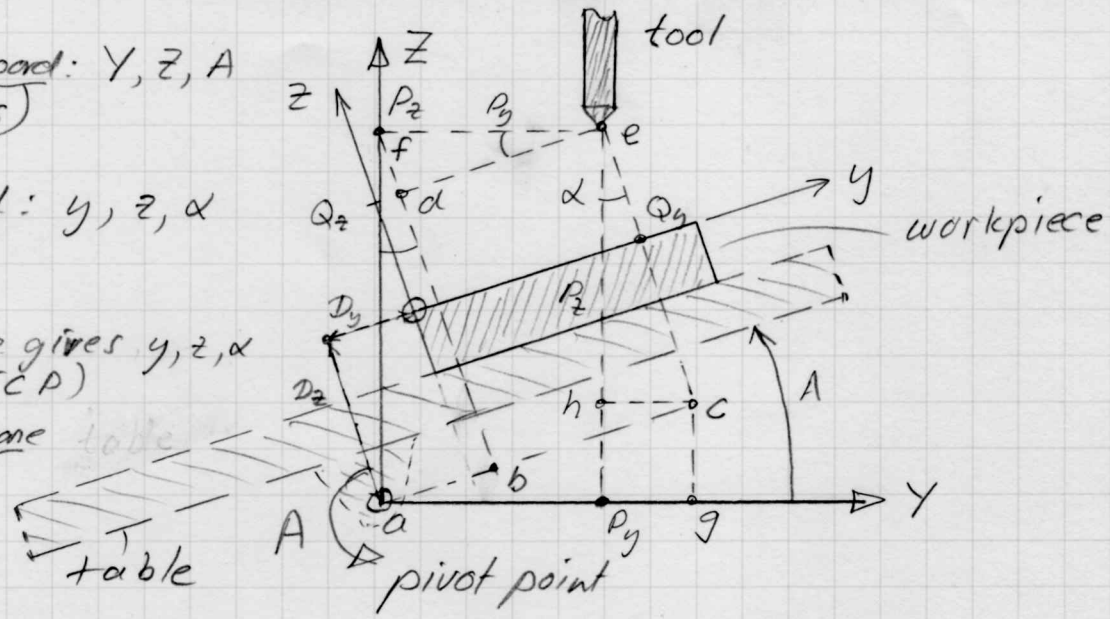
[redacted]

Machine Coord: Y, Z, A
(joints)

Work Coord: y, z, α
(world)

CAM software gives y, z, α
(TCP)

Control sofware needs
Y, Z, A



- Forward transformation: (from joint to work coord.)

$$Q_y + D_y = bc + ab = de + ab = P_y \cos A + P_z \sin A$$

$$Q_z + D_z = bf - df = P_z \cos A - P_y \sin A$$

or.
$$\begin{bmatrix} Q_y \\ Q_z \end{bmatrix} = \begin{bmatrix} \cos A & \sin A \\ -\sin A & \cos A \end{bmatrix} \cdot \begin{bmatrix} P_y \\ P_z \end{bmatrix} - \begin{bmatrix} D_y \\ D_z \end{bmatrix} \Bigg\} \rightarrow FWD$$

$$\alpha = A$$

- Inverse transfomation: (from work to joint coord.)

$$P_y = ag - hc = (Q_y + D_y)\cos A - (Q_z + D_z)\sin A$$

$$P_z = gc + he = (Q_y + D_y)\sin A + (Q_z + D_z)\cos A$$

or.
$$\begin{bmatrix} P_y \\ P_z \end{bmatrix} = \begin{bmatrix} \cos A & -\sin A \\ \sin A & \cos A \end{bmatrix} \begin{bmatrix} Q_y + D_y \\ Q_z + D_z \end{bmatrix} \Bigg\} \rightarrow INV.$$

$$A = \alpha$$