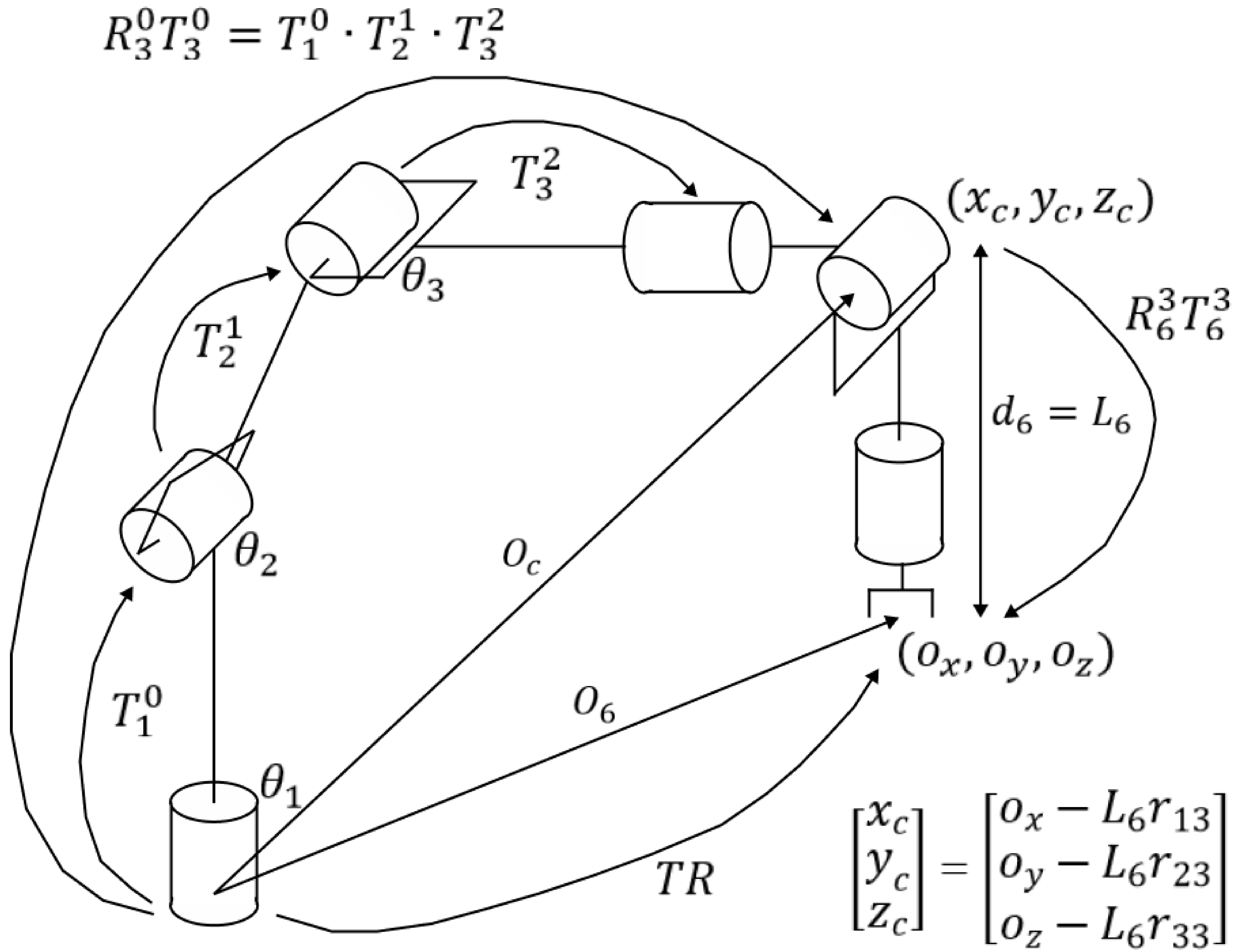
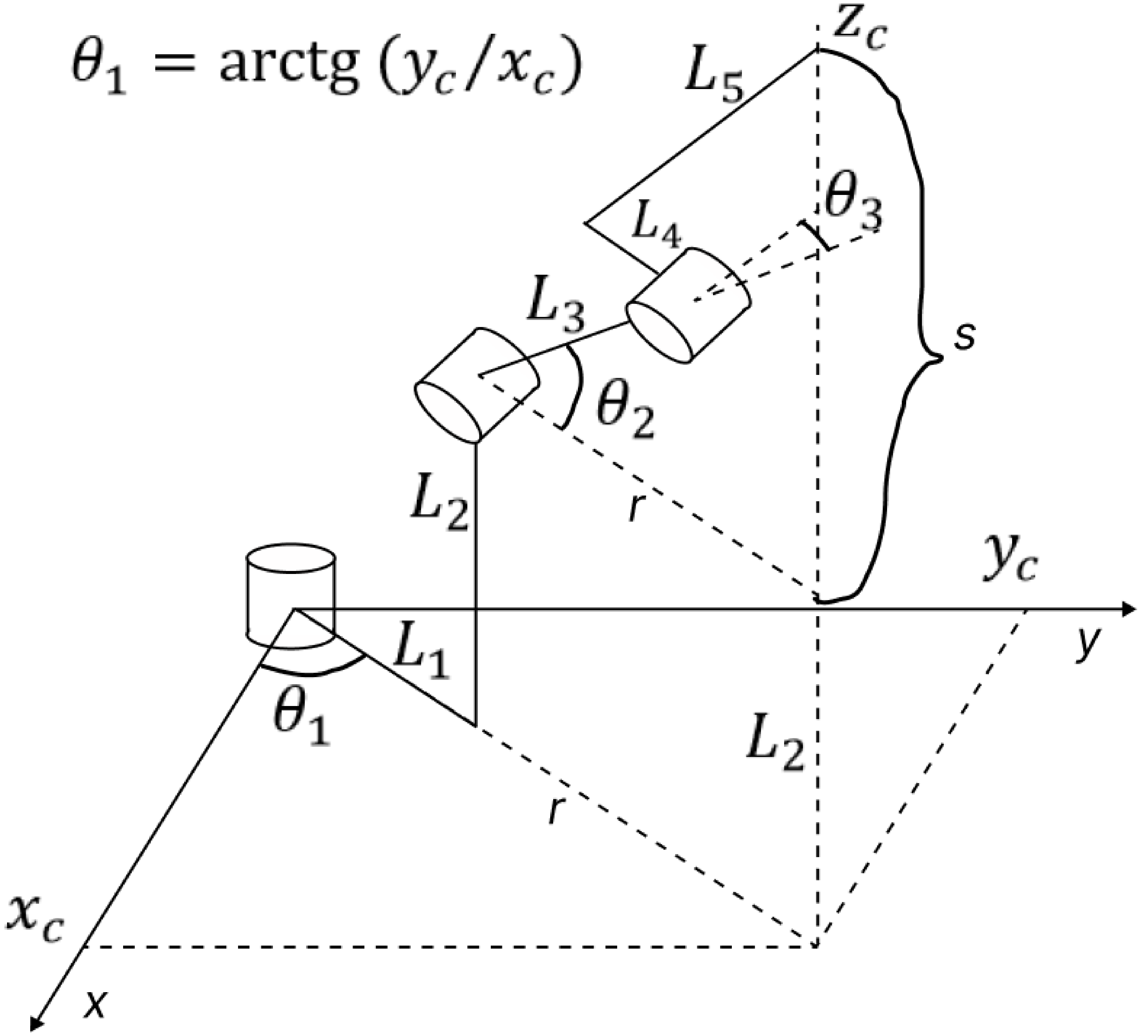
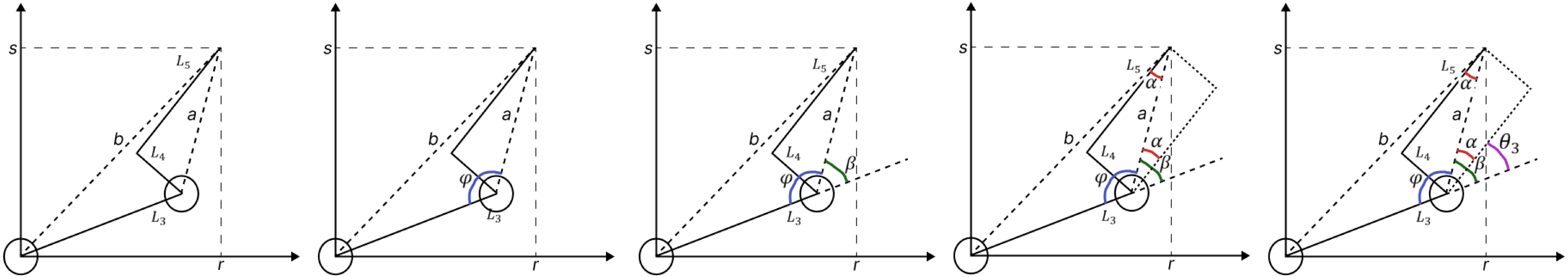

$R_3^0 T_3^0 = T_1^0 \cdot T_2^1 \cdot T_3^2$
T_3^2
(x_c, y_c, z_c)
θ_3
T_2^1
$R_6^3 T_6^3$
$d_6 = L_6$
θ_2
o_c
(o_x, o_y, o_z)
T_1^0
o_6
θ_1
TR
$\begin{bmatrix} x_c \\ y_c \\ z_c \end{bmatrix} = \begin{bmatrix} o_x - L_6 r_{13} \\ o_y - L_6 r_{23} \\ o_z - L_6 r_{33} \end{bmatrix}$


$\theta_1 = \mathrm{arctg}\,(y_c/x_c)$
z_c
L_5
θ_3
L_4
L_3
s
θ_2
L_2
r
y_c
y
L_1
θ_1
L_2
r
x_c
x

I



$$a = \sqrt{{L_4}^2 + {L_5}^2}$$
$$r = \sqrt{{x_c}^2 + {y_c}^2} - L_1$$
$$s = z_c - L_2$$
$$b = \sqrt{r^2 + s^2}$$

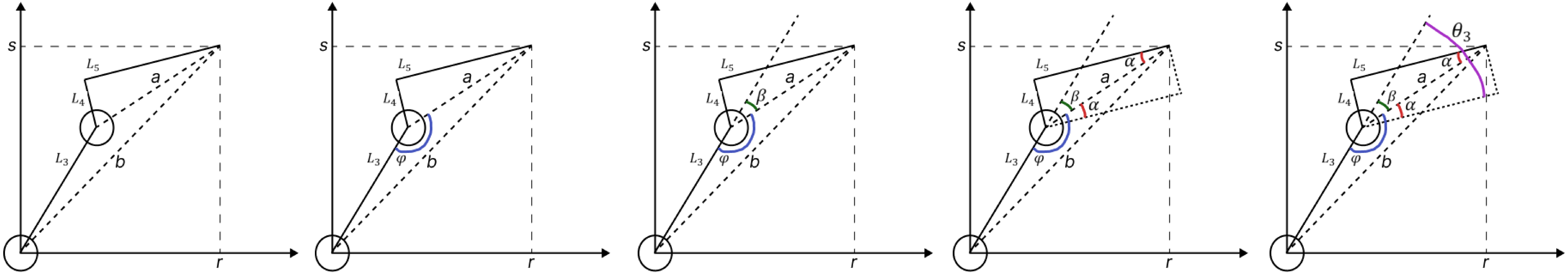
$$cos\varphi = \frac{{L_3}^2 + a^2 - b^2}{2 \cdot L_3 \cdot a} = D$$
$$\varphi = \arccos\,(D)$$

$$\beta = 180° - \varphi$$

$$\alpha = \mathrm{arctg}\,(L_4/L_5)$$

$$\theta_3 = \beta - \alpha + 90°$$

II



$$a = \sqrt{{L_4}^2 + {L_5}^2}$$
$$r = \sqrt{{x_c}^2 + {y_c}^2} - L_1$$
$$s = z_c - L_2$$
$$b = \sqrt{r^2 + s^2}$$

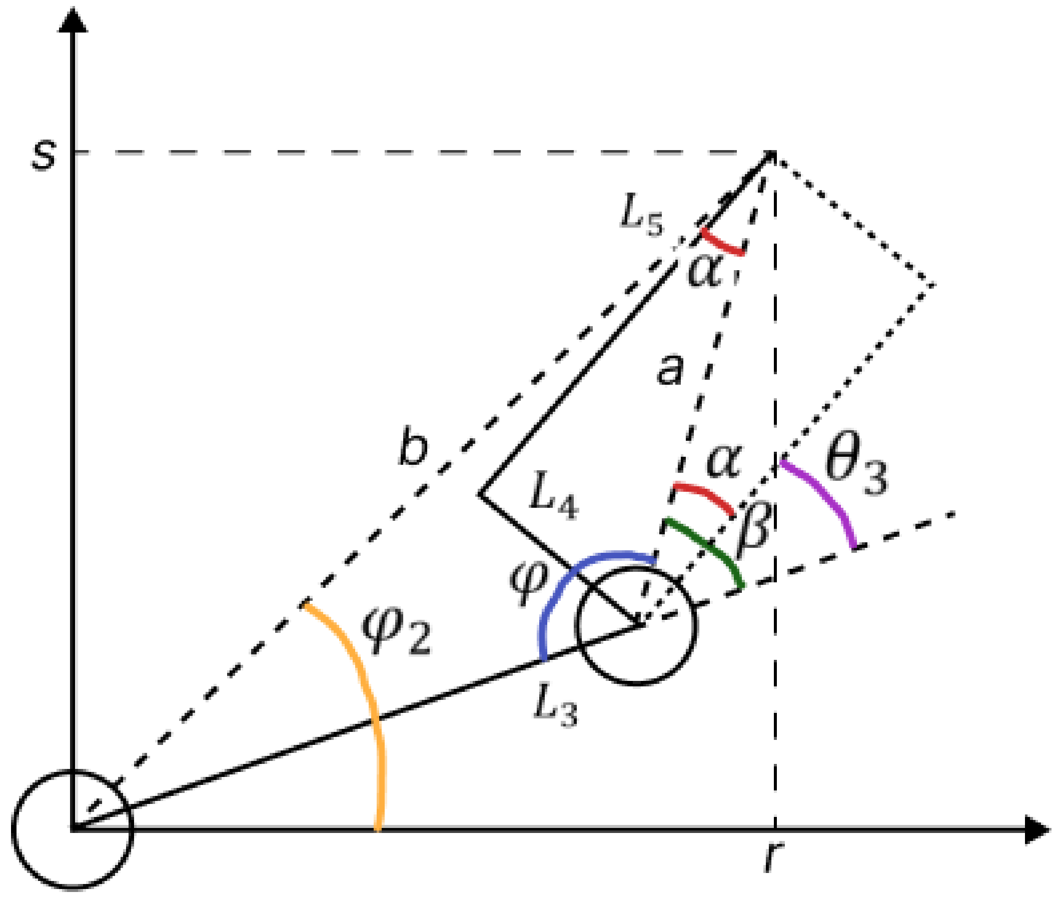
$$cos\varphi = \frac{{L_3}^2 + a^2 - b^2}{2 \cdot L_3 \cdot a} = D$$
$$\varphi = \arccos\,(D)$$

$$\beta = 180° - \varphi$$

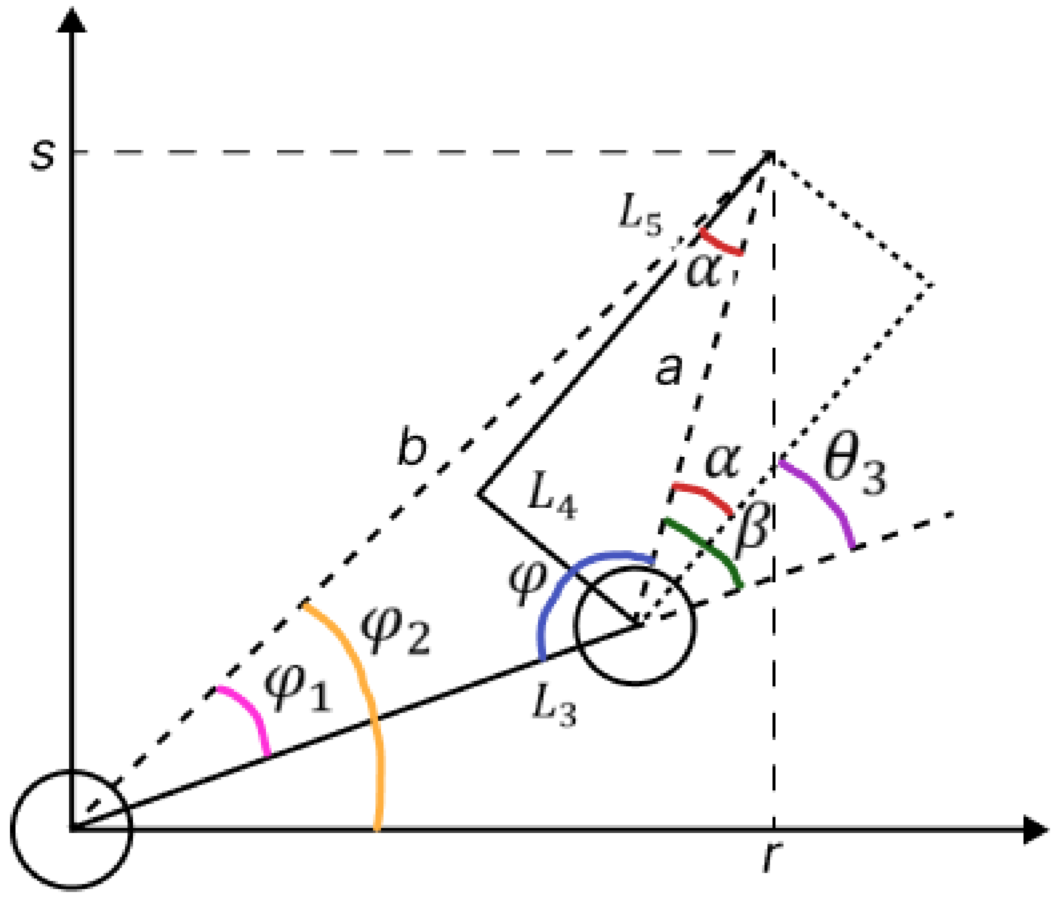
$$\alpha = \mathrm{arctg}\,(L_4/L_5)$$

$$\theta_3 = -(\beta + \alpha) + 90°$$

I

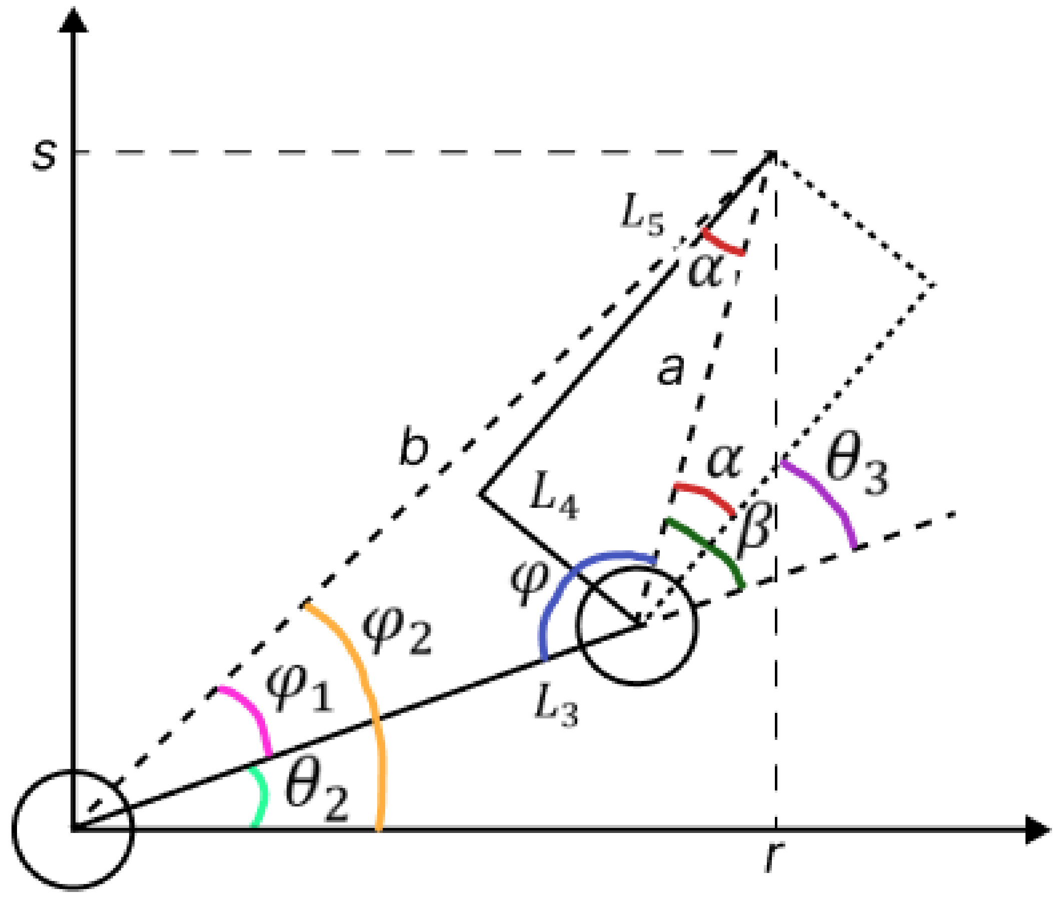


$$\varphi_2 = \operatorname{arctg}\,(s/r)$$



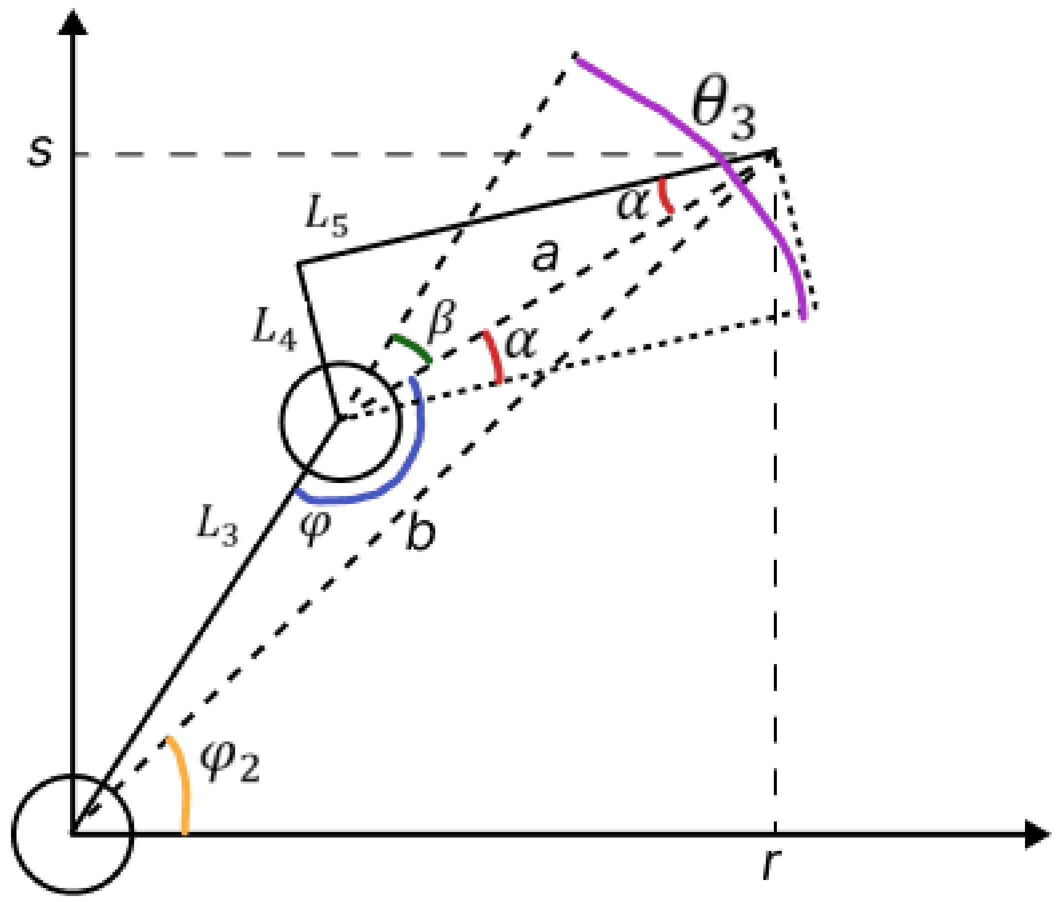
$$cos\varphi_1 = \frac{{L_3}^2 + b^2 - a^2}{2 \cdot L_3 \cdot a} = D_1$$

$$\varphi_1 = \arccos\,(D_1)$$

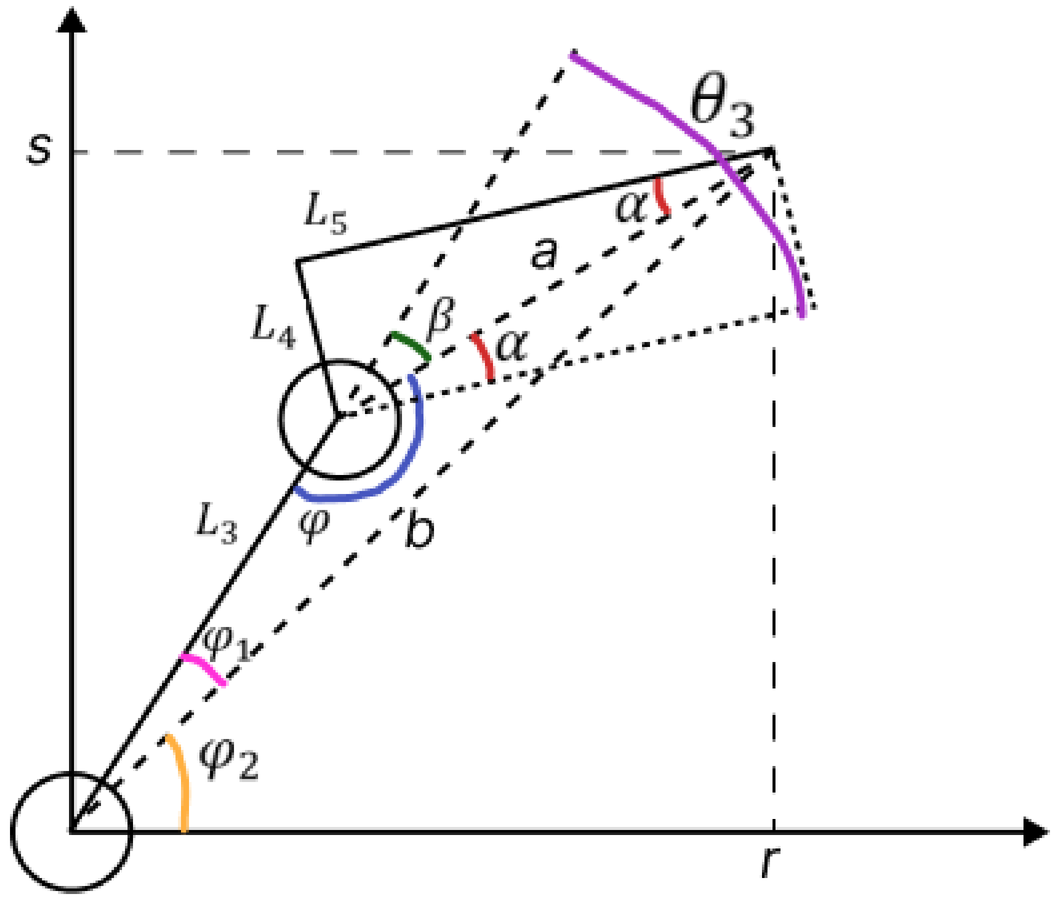


$$\theta_2 = \varphi_2 - \varphi_1$$

II

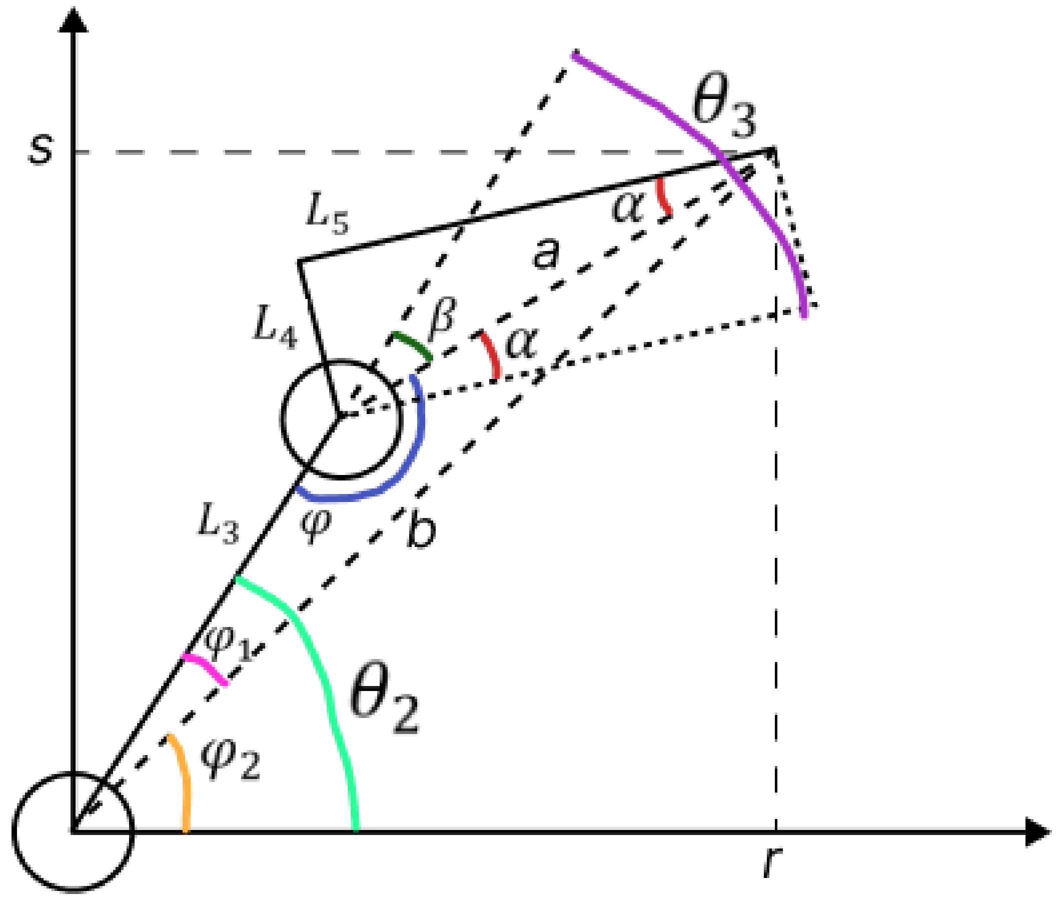


$$\varphi_2 = \operatorname{arctg}\,(s/r)$$

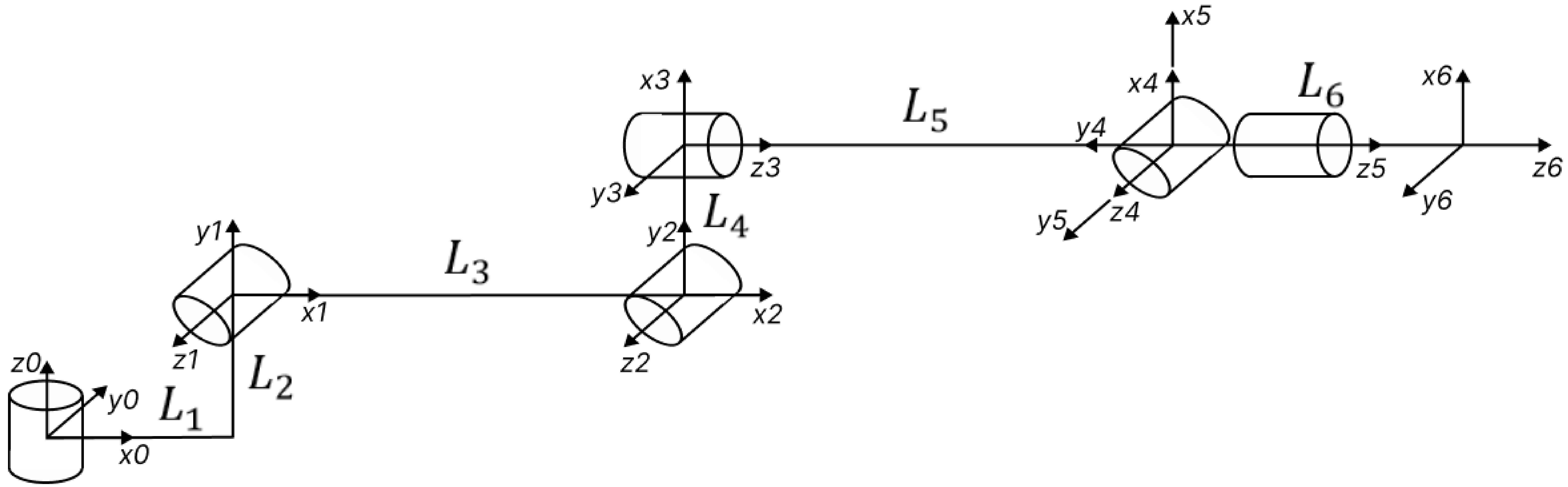


$$cos\varphi_1 = \frac{{L_3}^2 + b^2 - a^2}{2 \cdot L_3 \cdot a} = D_1$$

$$\varphi_1 = \arccos\,(D_1)$$



$$\theta_2 = \varphi_2 + \varphi_1$$



n	θ	α	r	d
1	θ	90°	L1	L2
2	θ	0°	L3	0
3	θ+90°	90°	L4	0
4	θ	270°	0	L5
5	θ	90°	0	0
6	θ	0°	0	L6

$$R_6^3 = \begin{bmatrix} cos\theta_4 cos\theta_5 cos\theta_6 - sin\theta_4 sin\theta_6 & -cos\theta_4 cos\theta_5 sin\theta_6 - sin\theta_4 cos\theta_6 & cos\theta_4 sin\theta_5 \\ sin\theta_4 cos\theta_5 cos\theta_6 + cos\theta_4 sin\theta_6 & -sin\theta_4 cos\theta_5 sin\theta_6 + cos\theta_4 cos\theta_6 & sin\theta_4 sin\theta_5 \\ -sin\theta_5 cos\theta_6 & sin\theta_5 sin\theta_6 & cos\theta_5 \end{bmatrix}$$

$$\theta_4 = \text{arctg}\,(R_6^3(2.3)/R_6^3(1.3))$$
$$\theta_5 = \arccos\,(R_6^3(3.3))$$
$$\theta_6 = \text{arctg}\,(-R_6^3(3.2)/R_6^3(3.1))$$

$$R = R_3^0 \cdot R_6^3 \rightarrow R_6^3 = R \cdot (R_3^0)^T$$