UNIVERSITÄT
HEIDELBERG
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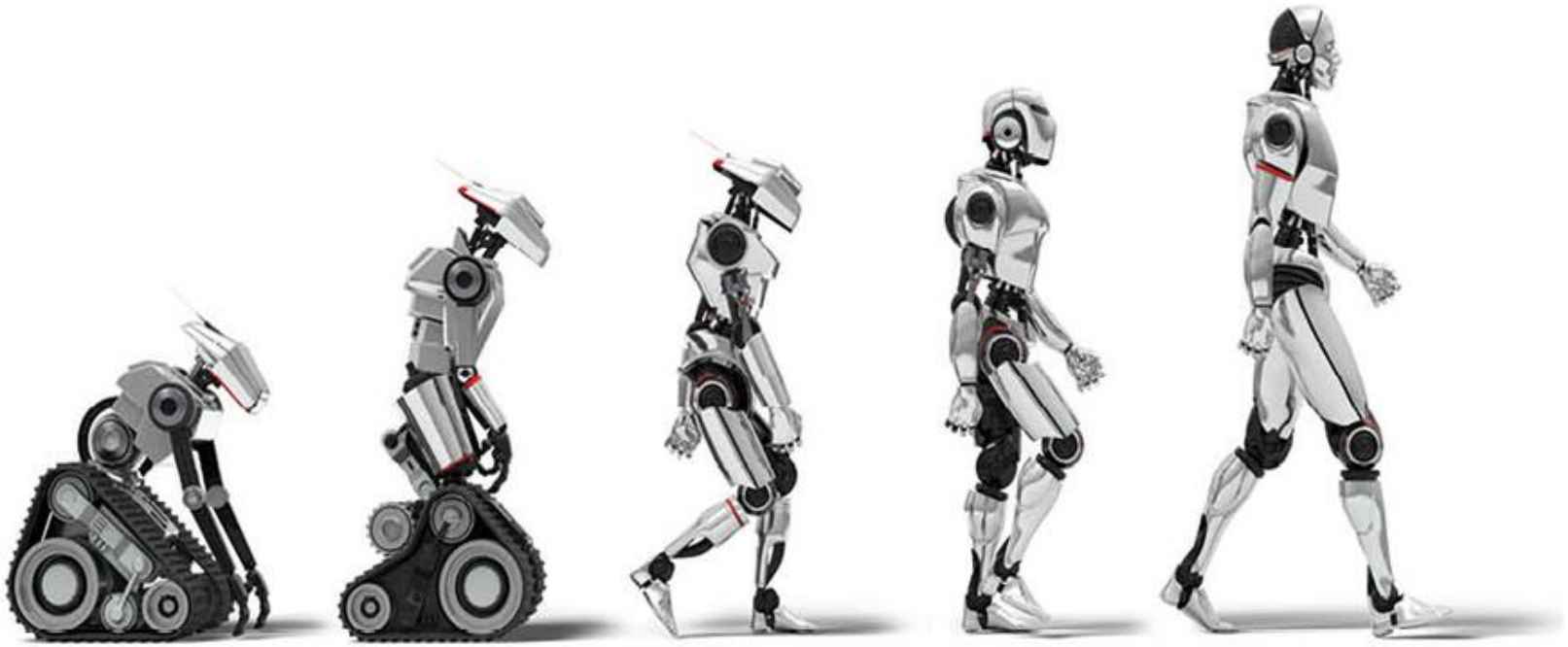
Universität Heidelberg

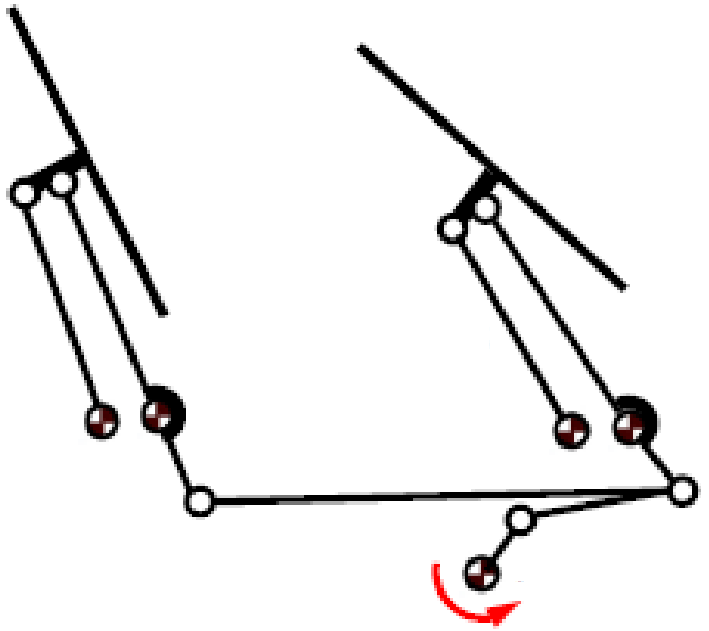
Fakultät für Physik und Astronomie

Exercises Robotics 3



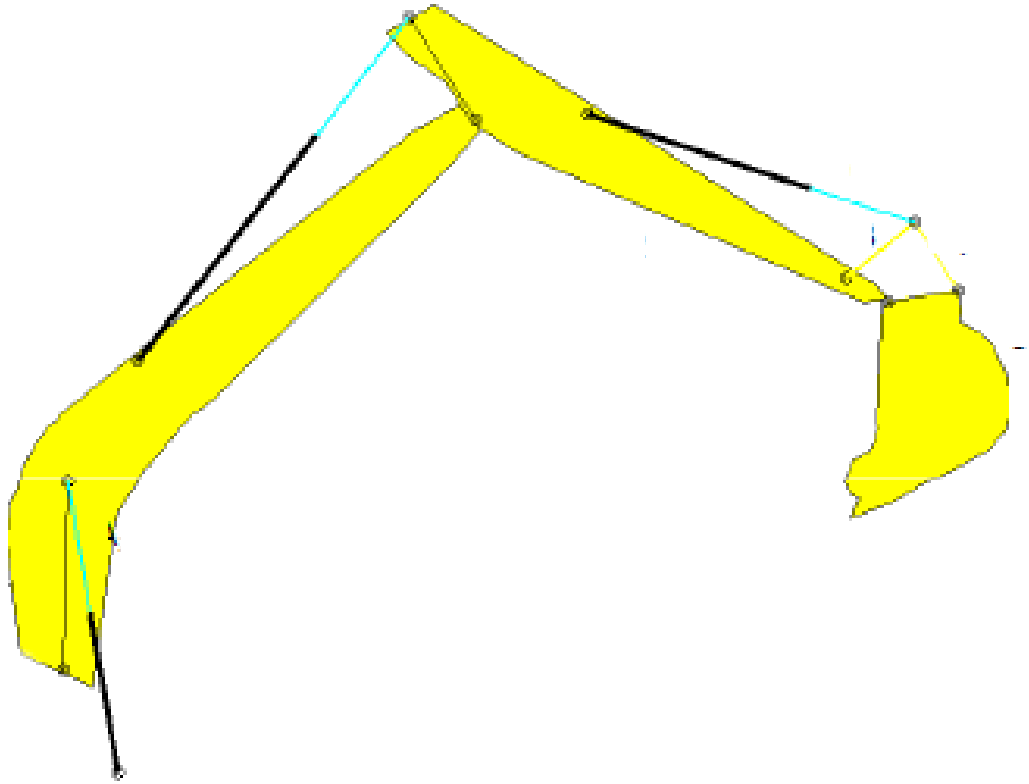
Grübler’s equation

WINDSCREEN WIPER:



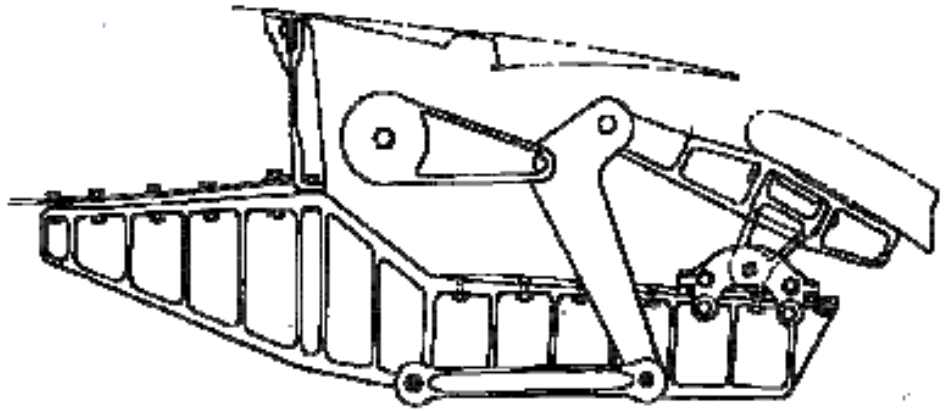
Grübler’s equation

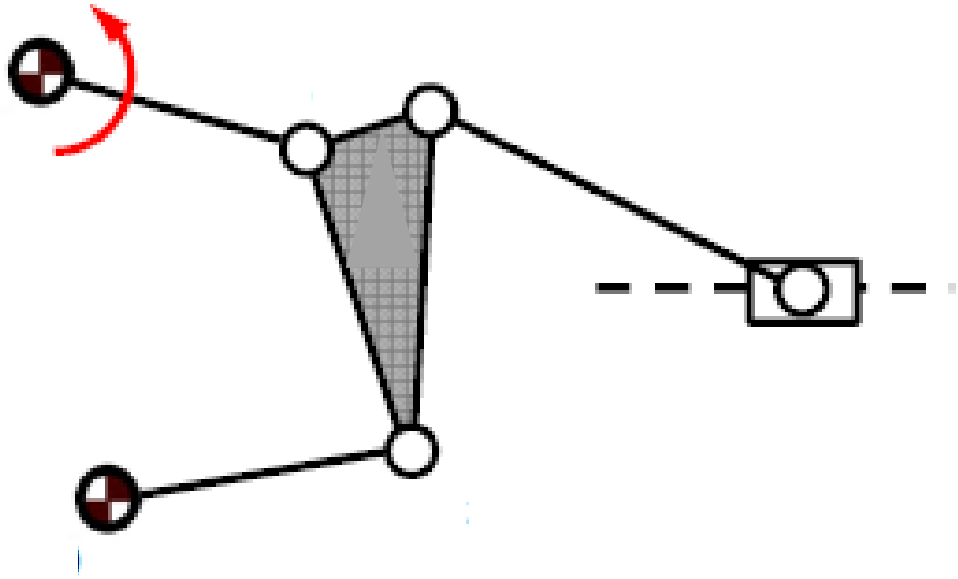
EXCAVATOR:



Grübler’s equation

FLAP MDD:





Grübler's equation

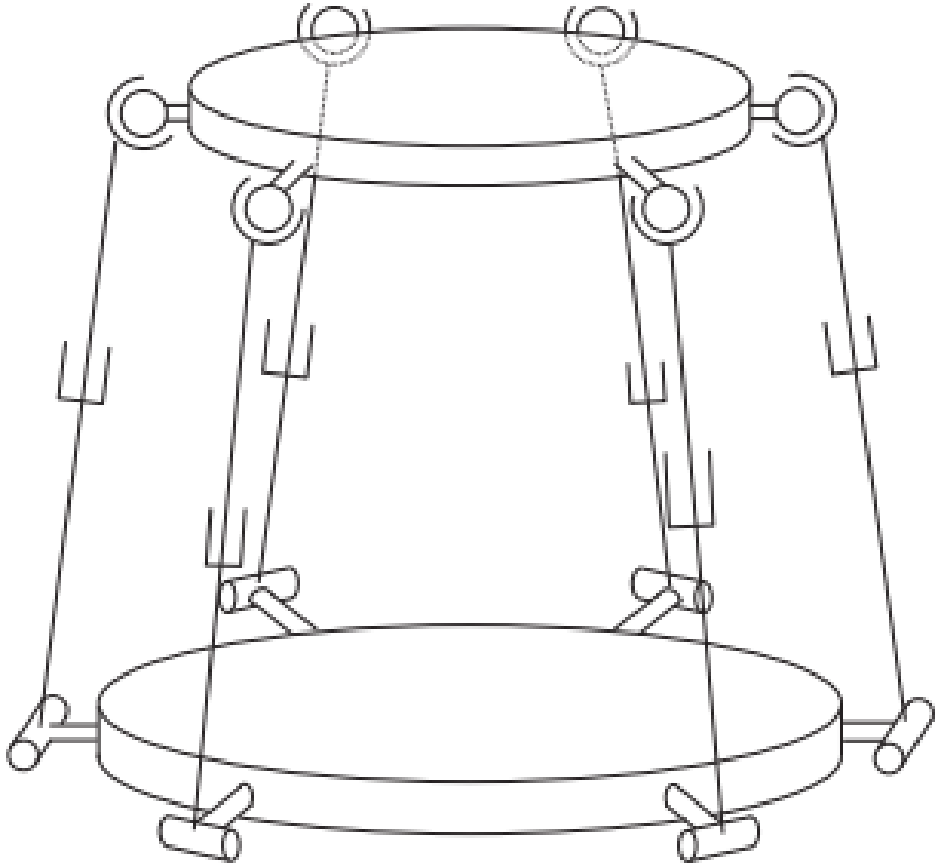


Figure 2.10: The Stewart-Gough Platform.

Denavit-Hartenberg

Create a table of link parameters a_i, d_i, α_i, θ_i.

$a_i =$ distance along x_i from o_i to the intersection of the x_i and z_{i-1} axes.

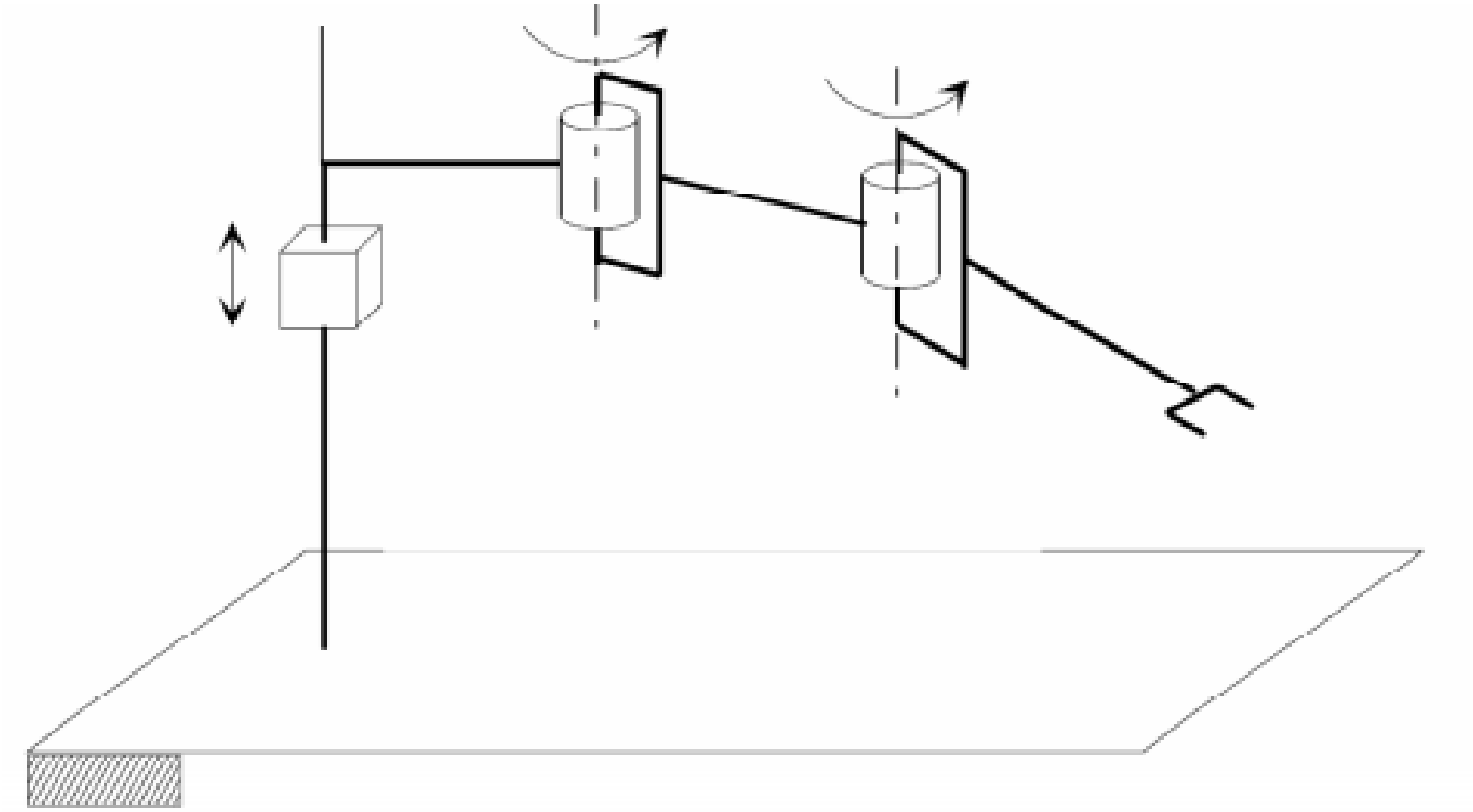
$d_i =$ distance along z_{i-1} from o_{i-1} to the intersection of the x_i and z_{i-1} axes. d_i is variable if joint i is prismatic.

$\alpha_i =$ the angle between z_{i-1} and z_i measured about x_i

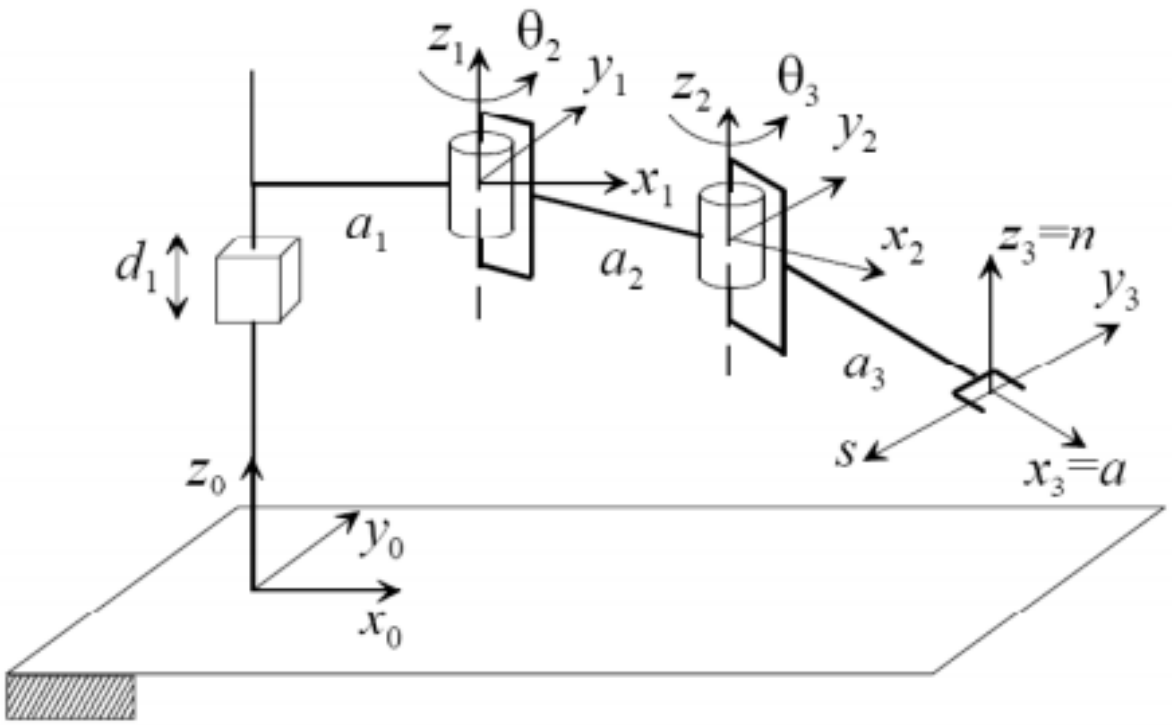
$\theta_i =$ the angle between x_{i-1} and x_i measured about z_{i-1} . θ_i is variable if joint i is revolute.

Link	a_i	α_i	d_i	θ_i
1				
2				
$\dot{n}$				

Denavit-Hartenberg



Denavit-Hartenberg



	a	α	d	θ
1	a_1	0	d_1	0
2	a_2	0	0	θ_2
3	a_3	0	0	θ_3

	r_1	r_2	r_3	Δx	
3x3 rotation matrix	r_4	r_5	r_6	Δy	3x1 translation
	r_7	r_8	r_9	Δz	
1x3 perspective	0	0	0	1	global scale

Thank you for your Attention!!!