

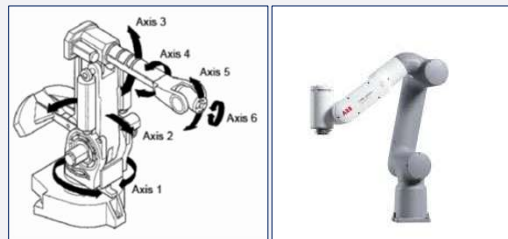
Must-to-know robots

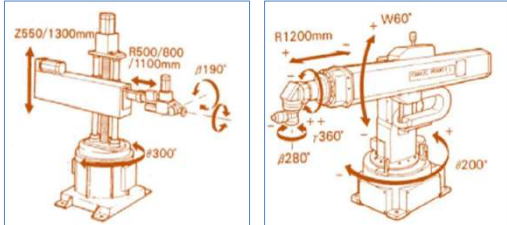

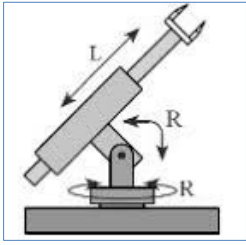

M. Bouri, December. 2025

6 Dofs robot



Numerical controller





Early 1970s Unimate configuration, courtesy Kawasaki Robotics (USA), Inc.

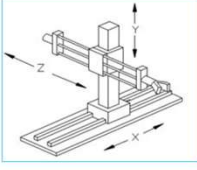

“Selective Compliance”

The SCARA, a mechanically selective compliant robot

The Cartesians (TTT)

Also called «Gantry systems» or «Gantries»

3

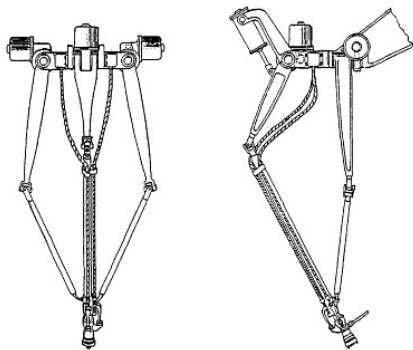
EPFL

Parallel Robots – The «Pollard»

4

Since When?

The oldest «known» is Pollard robot (Pollard 1938) invented by Mr Pollard



The predecessor of the Delta: It does not block the orientations of the wrist.



EPFL [L. E. Rey, [Environnement pour la conception de commandes de robots](#), PhD thesis, EPFL,1997]

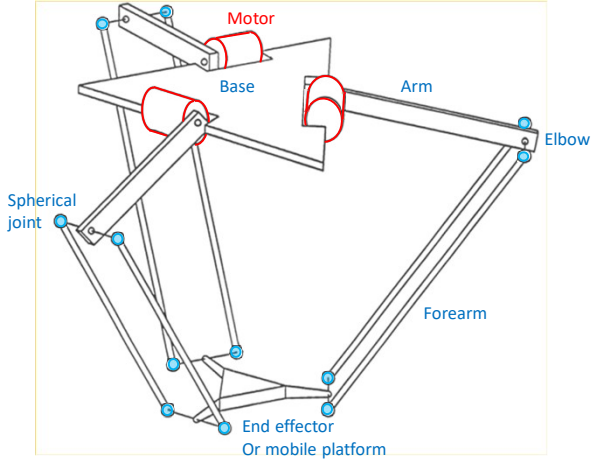
Dr M. Bouri, Septembre 2025

The robot "Delta" The precursor for the market of parallel robotics.

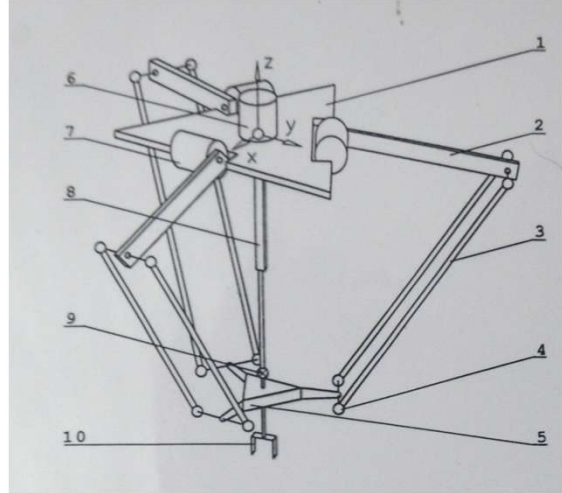
5

Principle

Angular Delta with 3 DOFs (X, Y, Z)



Angular Delta with 4 DOFs, (X, Y, Z, and Rotation around Z)



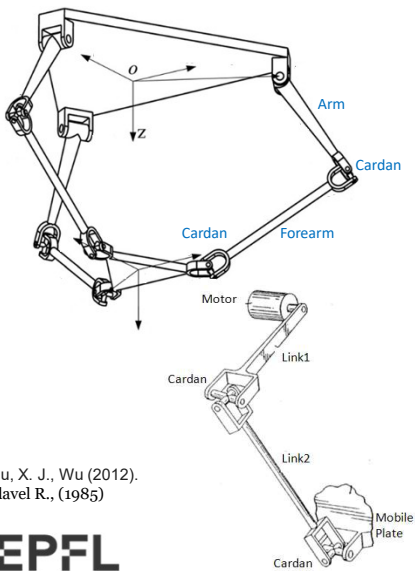
1985 – Patented by R. Clavel (EPFL)
 1988 – The patent is sold to the Swiss company Demareux SA (now Demareux Robotics, Renens)
 1992 – The first customer was Nestlé.

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Three configurations of a three-degree-of-freedom angular Delta robots

6

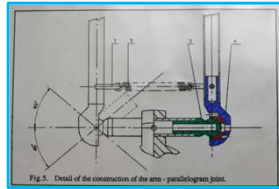
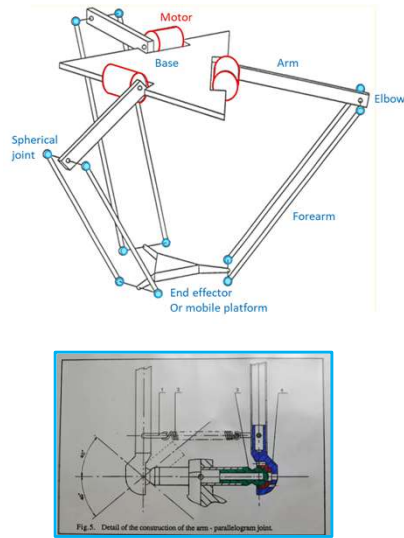
1-With universal joints only



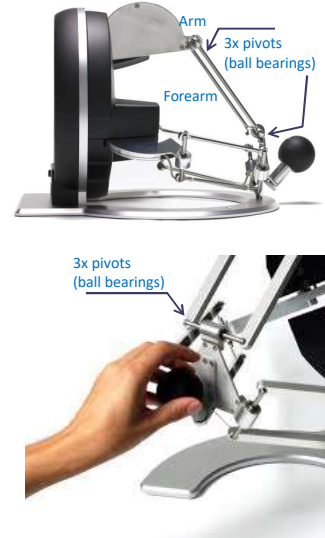
Liu, X. J., Wu (2012).
 Clavel R., (1985)



2-With spherical joints only



3-With pivots



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Types of the linear Delta

7

			<p>High precision applications EPFL-2001 MX3000 from MECARTEXSA http://www.mecatex.ch/</p>	
<p>Horizontal linear structure,</p>	<p>Vertical structures,</p>	<p>Orthogonal,</p>		<p>The Inclined Keops-</p> <p>Inclined guided</p>

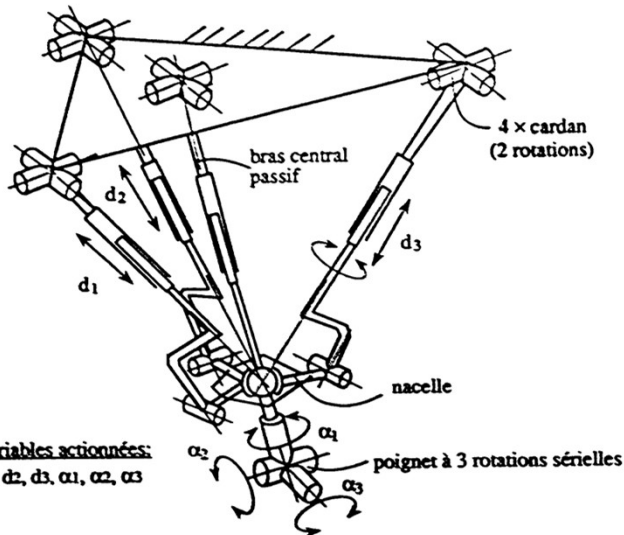
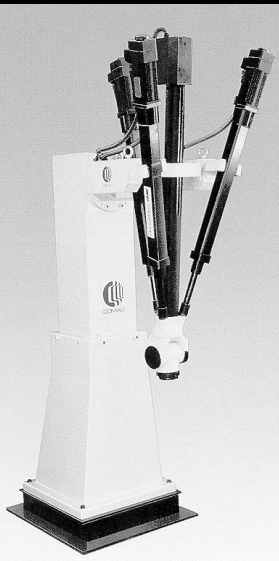


Bouri, M, and Clavel, R, "The linear delta: Developments and applications." *ISR 2010*

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The Tricept (Tetrabot)

8

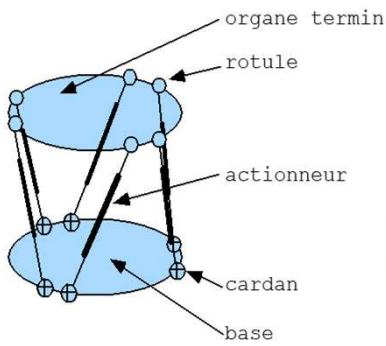


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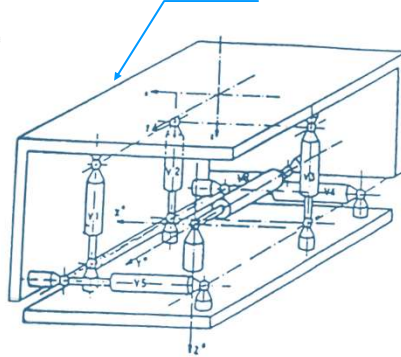
Platforms 6 DOFs

9

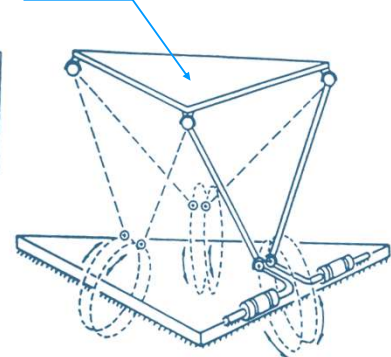
GOUGH-STEWART (1962)



ARTIGUE (1984) and HUNT (1983)



• Decoupled for small motions



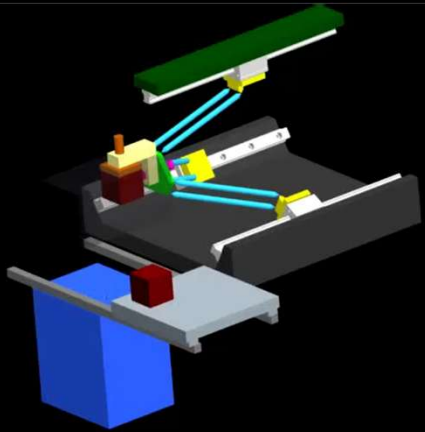
• Actuators fixed to base



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Hybrid solutions to obtain more DOFs

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Parallel + serial

XYZ using the Delta linear + serial double-tilt
Ref. Unitechnology SA / Laser polishing



Right and Left Hand combination

XYZ using the Delta linear + Orion double-tilt + Z
Ref. Mecartex SA /Micro EDM



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