

A photograph of an industrial robotic welding cell in a car manufacturing plant. Several yellow robotic arms are positioned around a silver car chassis. One arm is actively welding, creating bright sparks. The background shows more of the factory floor with various equipment and structures. A blue curved banner is at the top of the image.

Industrial Robotics

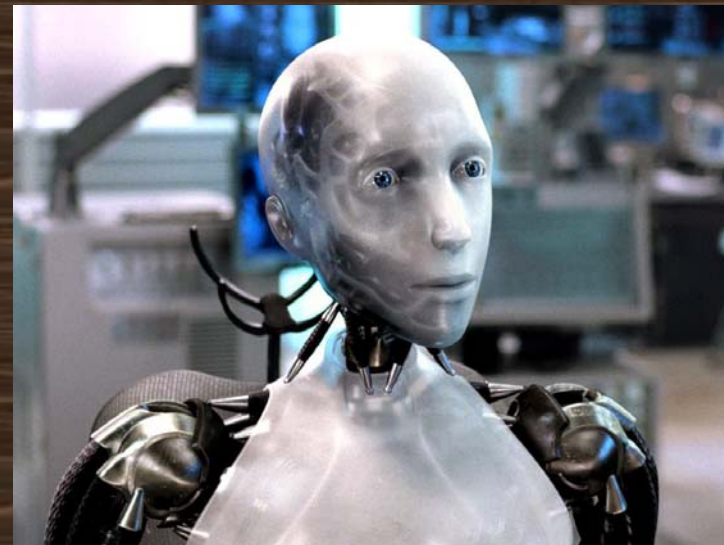
Endre Tamas Nagy

How am I?

- Trefort Ágoston Bilingual Secondary School
- Electronics – electrotechnics
- Interested in
 - Human – Robot relations
 - Humanoid Robots
 - Robot Personality
 - Biorobotics - a study of how to make robots that emulate or simulate living biological organisms mechanically or even chemically
 - Cyborgs

Robotics

- Design, Application, Manufactures
- Three Laws of Robotics – Isaac Asimov
- 1960s
- Robot types
 - Repeaters
 - Artificial Intelligence



Men VS. Robots

❖ Men

- Tired
- Illness
- Coffee, Smoking

❖ Robots

- Dangerous
- Complicated
- Monoton

Industrial Robotics

- Automatically controlled
- Programmable
- multipurpose manipulator
- Most commonly used robot configurations
 - SCARA
 - Delta robot
 - Cartesian coordinate robot
 - Articulated robot



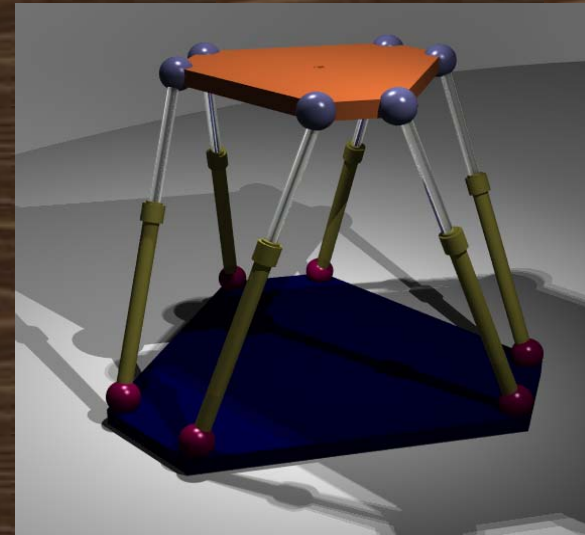
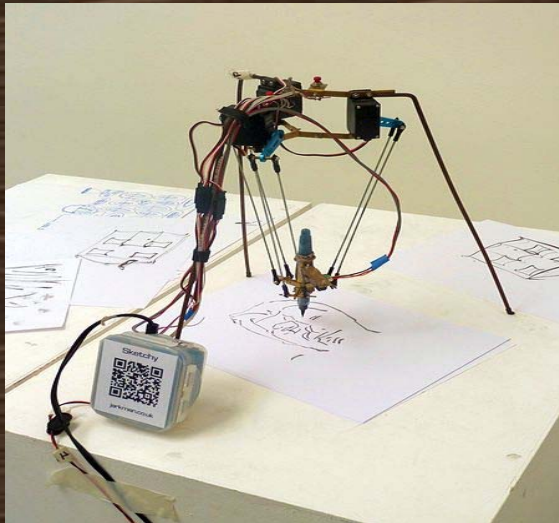
SCARA

- Selective Compliance Assembly/Articulated Robot Arm
- Features
 - Selective Compliant – rigid in the Z direction
 - Articulated – human arm-like
 - Rigid in the Z-axis
 - Pliable in XY-axes
 - High speed
 - Lightweight
 - Small device



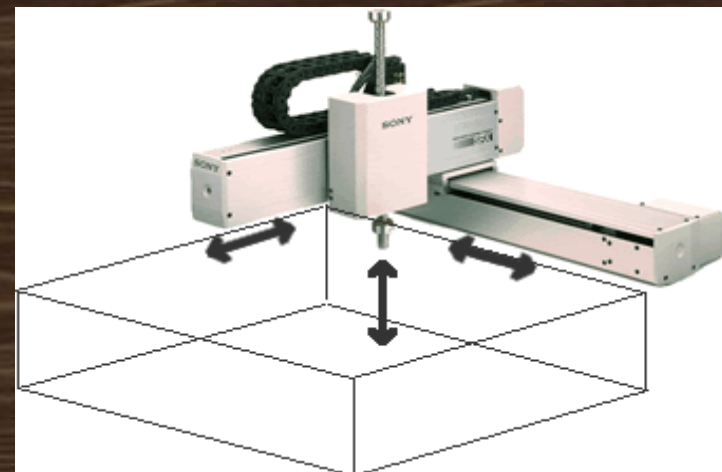
Delta Robot

- Features
 - Parallel
 - No rotation
 - picking and packaging
 - High speed – arms - light composite materials



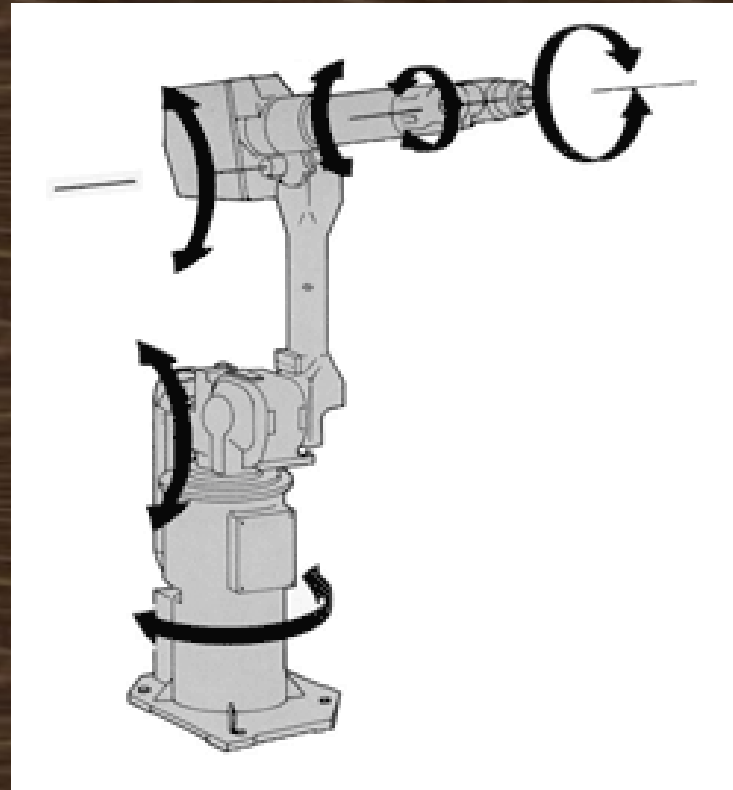
Cartesian coordinate robot

- Features
 - Linearly
 - Right angles
 - Milling
- CNC machine – computer numerical control
- Gantry robot



Articulated Robot

- Rotary joints
- „Chain”



Defining Parameters

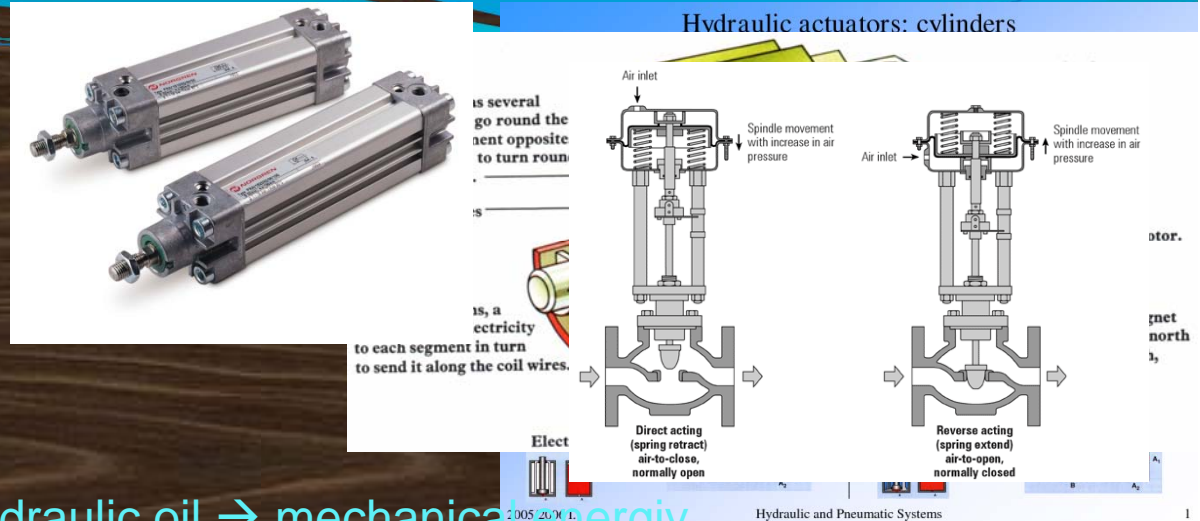
- Number of Axes – 2 axes-plane, 3 axes-space
- Degree of Freedom – „boat”
- Working Envelop – reachable space
- Kinematics – arrangement of rigid members, possible motions
- Payload
- Speed – all axes are moving
- Acceleration
- Accuracy
- Repeatability
- Motion Control - continuously
- Energy Source – suitable ex:flamability
- Drive – gears-”backlash”(holtjáték)
- Compliance – payload-position

Manipulators

- Tasks
- Degree of Freedom (DOF)
- Effectors- tool at the end of the robot arm
 - Welding
 - Painting
 - Gripping

Actuators

- Energy → motion
- Hydraulic
 - Cylinder filled with hydraulic oil → mechanical energy
 - Huge force
 - Low Speed and Acceleration
- Pneumatic
 - Compressed air → linearly, rotation
 - Fast
- Electrical
 - Cleanest
 - Converts electrical energy into mechanical torque
- Mechanical
 - Converts rotation into linearly motion
 - gears, rails, pulleys, chains and other devices to operate



Sensors

- Linear and Rotation
- Acceleration
- Force
- Torque and Power
- Flow
- Temperature
- Distance and Proximity
- Vision and Optical

End-Effectors

- At and of the manipulator
- Interact with the environment
- type – depends on the application
 - Gripper
 - Shape – according the shape of the object
 - Generally 2 fingers
 - Welders
 - Resistant Spot-weders
 - AC - Over 1800 C
 - Copper-low resistant to current flow
 - Holding time-after shutting down the current, steel remains under prucsher during solidification
 - Additional pressure-> stronger weld
 - Painting tool



Thank you for your attention!

- Sources:

- http://en.wikipedia.org/wiki/Outline_of_robotics
- http://en.wikipedia.org/wiki/Industrial_robot
- http://en.wikipedia.org/wiki/Articulated_robot
- <http://en.wikipedia.org/wiki/SCARA>
- http://en.wikipedia.org/wiki/Cartesian_coordinate_robot
- http://en.wikipedia.org/wiki/Delta_robot
- http://en.wikipedia.org/wiki/Parallel_manipulator
- Youtube.com