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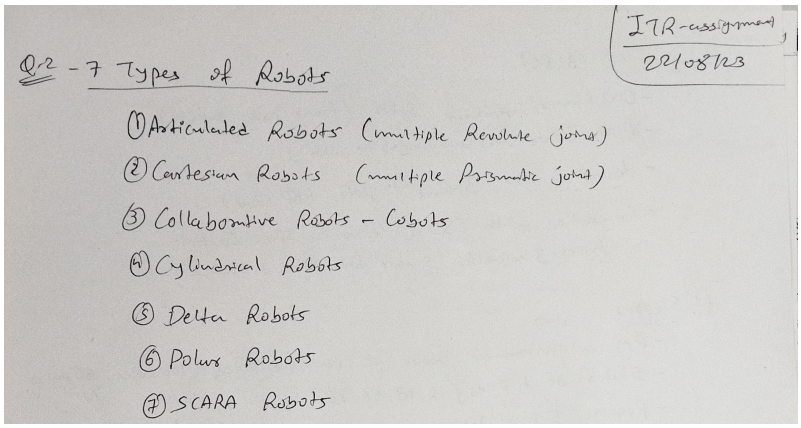
23210047 (M.Tech in Mechanical Engineering)

ITR Assignment-1 Tasks:

1. Read Chapter 1 of the textbook.

2. Identify one or two examples of robots for each of the seven categories of robots mentioned in class. Submit your selected examples as a list of YouTube links with 2-3 line explanations for each.

=> 7 categories of Robot



1. Articulated Robot
- RRR/RRRR/..typeconfiguration
- Multiple revolute joint in chain (SCM)
- Mimics human arm
- Fanuc LR Mate 200iD/4S
- Puma260

2. Cartesian Robot
- PPP type configuration
- 3 principal axes of control are linier
- Kuka KR80L
- ONEreach Cartesian robot

3. Collaborative Robot (cobot)
- Low force, human interaction, safe
- Different from Traditional Robot
- Universal ur5e
- Kuka HRC

4. Cylindrical Robot

- RPP type configuration
- ANALEXrobot R19

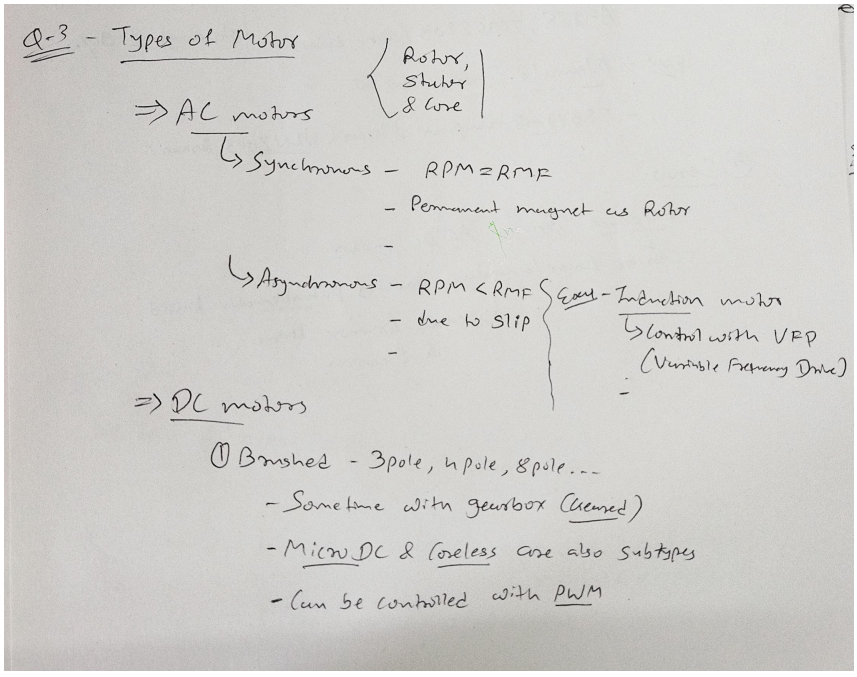
5. Delta Robot
- Mostly used in pick & place
- Kuka KR Delta

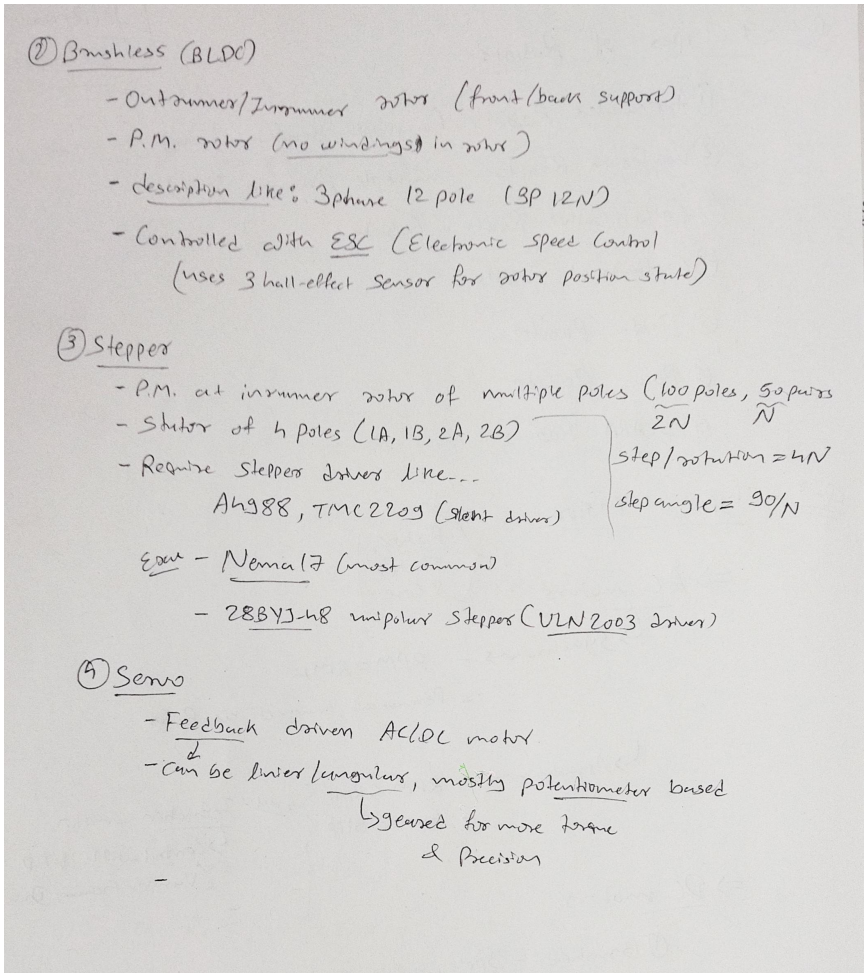
6. Polar Robot
- Robot configuration with a combined linear joint & 2 rotary joint
- Also known as special robot
- Stanford type robot

7. SCARA Robot
- PRR type configuration
- Selective Compliance(flexibility in one direction) Assembly Robot Arm
- Mostly used in P&P & assembly operations
- Kuka KR SCARA

=> Ref:
- https://robodk.com/download
- https://robodk.com/industrial-robots-reach/
- https://robodk.com/doc/en/Getting-Started.html
- https://robodk.com/blog/industrial-robot-reach-charts/

3. Review the most common types of motors and summarize them with a 2-3 sentence description of each of them. The description offered in this video may be a good starting point.

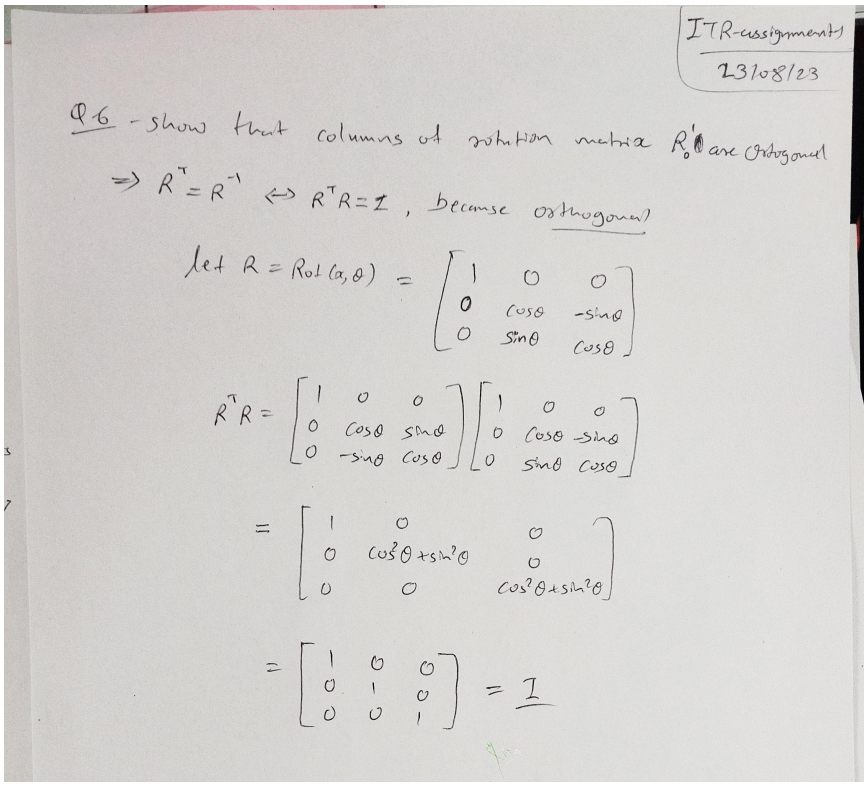




4. Review the basic kinematic principles summarized in **this video**.

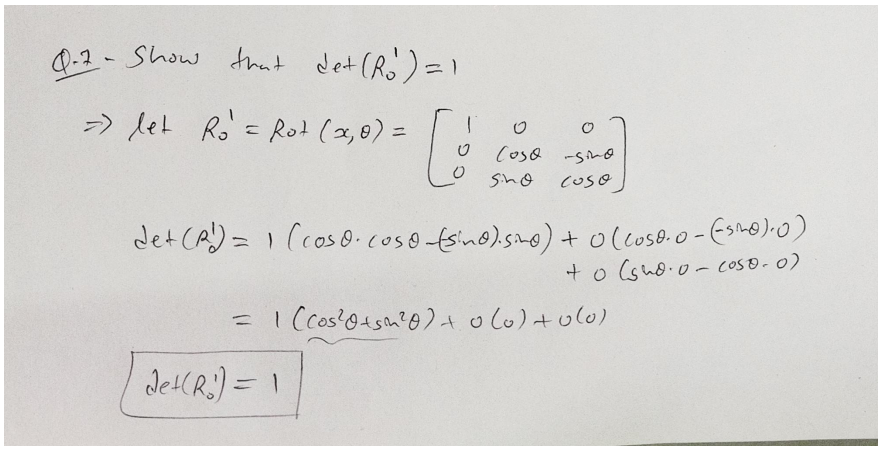
5. Review the key ideas related to connecting motor drivers, microcontrollers, and power supply to a motor described in the **link here**. This information
maybe useful for future implementation.

6. Show that columns of the rotation matrix R(0, 1) are orthogonal.



Ref

7. Show that det(R 0,1) = 1.



8. Read about the order of rotations and sample examples in the textbook.
9. Review the textbook explanation and example related to a rotation matrix for rotation about an arbitrary axis k.

Submit the assignment in the form of a PDF with active links for Task 2 and appropriate explanations for Task 3, 6, and 7. Nothing is to be submitted for tasks 1, 4, 5, 8 and 9.