PARTH DESHPANDE
21110157

ITR
ASSIGNMENT 3&4:

TASKS:

1. Singular configurations are the one's which parallel robots lose their rigidity. The end-effector will have uncontrollable degrees of freedom.
For Ex. When two R joints axes anywhere are collinear, a singularity results since an equal and opposite rotation about the axes results in no net motion of the end-effector.

$$\dot{x} = J(q)\dot{q}$$
$$dx = J(q)\,dq$$

When the rank of J falls / decreases, then we have an Unatta... config. i.e J → singular. i.e $|J| = 0$.
When $|J|$ approaches 0, we can approx. say that the config might be singular.

7. The 3 configurations for 2R Manipulator are:

Direct Drive
End-effector is directly connected to the manipulator's joints through links.
→ straightforward & direct control mechanism
→ Each joint has a single motor/actuator.
→ Makes it easier to control, design and reduces complexity.

Remotely-Driven
The end-effector is not connected and driven by external agents/ mechanisms.
→ Requires external driving mechanisms. Remote mech/ electronic linkage.
→ Great flexibility in design of end-effector.
→ Can be used for more complicated tasks and reach more points / create bigger workspace.

5-bar parallelogram
→ Additional Halogram linkage.
→ Includes extra set of links & joints.
→ The end-effector has wider range of motion
→ Enhanced stability/ reduced sensitivity
→ Potential for pre... control.