

Robotics Basics FAQs

Q1 - What are the two workspaces of a robot?

A robot may be described using its two workspaces.

The joint workspace defines the mechanical limits of each joint (motor) taken individually.

The tool workspace describes all the points (poses) accessible by the tool. Most often, this working volume (workspace) refers to the working volume of the tool.

Q2. What is the number "degrees of freedom of a robot"?

Degrees of freedom (DOF) is the number of the (geometrically) independent variables required to define the pose of the end effector (tool) of a robot. The maximum being equal to 6.

Q3. What is a redundant robot?

A redundant robot is a robot for which the number of active (motorized) joints is greater than the number of degrees of freedom. This only concerns the redundancy of actuation.

Q4. What are the uses of robot redundancy?

This paragraph concerns an actuation redundancy. The utilities of redundancy can be summarized as follows:

- Increase in robot work volume
- Safety in the event of an actuator failure.
- Obstacle avoidance in confined spaces.
- Rough-fine positioning
- Fast-slow positioning

Q5- How many dofs does the SCARA have?

The SCARA belongs to the RRT kinematic family- All SCARAs possess a 4th orientation around the axis of gravity so as to compensate for the orientation of the tool caused by the orientation of the two upstream joints. The SCARA thus has 4 degrees of freedom : **X, Y, Z and Rz**.

Q6- What is SCARA (SCARA) used for?

The name SCARA is an acronym for **Selective Compliant Assembly Robot Arm**. The most important keywords are **assembly** and **selective compliance**. Compliance is an elastic behavior (spring effect). The motion of the robot is compliant in one direction if its motion is associated with an elastic behavior (in that same direction). The compliance at the two RR serial rotations of SCARA generates elastic compliance in the object positioning plane. The compliance is selective because we can decouple the positioning compliance from the insertion stiffness (vertical axis).