Inverse Orientation Kinematics Questions

1. When the SCARA draws a circle with all three of its wrist joints at zero, how does the orientation of the end-effector frame change over time? Sketch and/or explain.

2. What shape will the SCARA draw if we set the fifth joint at plus or minus ninety degrees?

3. We want the end-effector's z-axis to point out toward the camera with its x-axis horizontal to the right. What rotation matrix **R** should we give to the inverse orientation kinematics?

4. How can we calculate R03 from the available information? We have the function scara_robot_with_wrist_fk.m, which returns points to plot along the robot, plus coordinates of x06, y06, and z06 line segments.

5. How does our model of the PUMA's spherical wrist (below left) differ from SHV's spherical wrist (below right) when compared to ZYZ Euler angles (bottom)?