
PROBLEMS

- 5-1 For the three-link planar manipulator of Example 5.1.1, compute the vector \mathbf{o}_c and derive the Jacobian (5.1.29).
- 5-2 Compute the Jacobian J_{11} for the 3-link elbow manipulator of Example 5.3.2 and show that it agrees with (5.3.14). Show that the determinant of this matrix agrees with (5.3.15).
- 5-3 Compute the Jacobian J_{11} for the three-link spherical manipulator of Example 5.3.3.
- 5-4 Show from (5.3.19) that the singularities of the SCARA manipulator are given by (5.3.20).
- 5-5 Find the 6×3 Jacobian for the first three links of the cylindrical manipulator of Figure 3-7. Show that there are no singular configurations for this arm. Thus the only singularities for the cylindrical manipulator must come from the wrist.
- 5-6 Repeat Problem 5-5 for the cartesian manipulator of Figure 3-17.
- 5-7 Complete the derivation of the Jacobian for the Stanford manipulator from Example 5.2.2.