

EXERCISES

- 4.1 [15] Sketch the fingertip workspace of the three-link manipulator of Chapter 3, Exercise 3.3 for the case $l_1 = 15.0$, $l_2 = 10.0$, and $l_3 = 3.0$.

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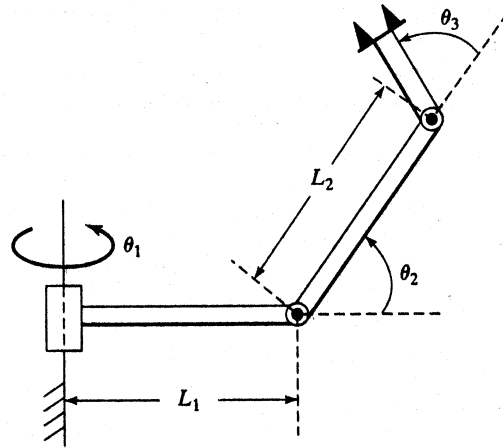


FIGURE 3.29: The 3R nonplanar arm (Exercise 3.3).

- 4.9 [26] Figure 4.13 shows a two-link planar arm with rotary joints. For this arm, the second link is half as long as the first—that is, $l_1 = 2l_2$. The joint range limits in

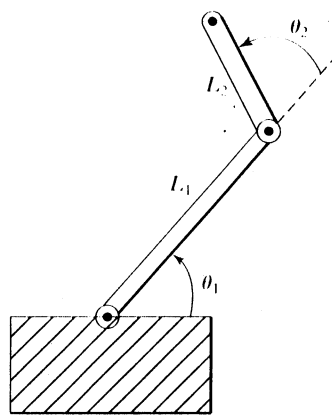


FIGURE 4.13: Two-link planar manipulator.

degrees are

$$0 < \theta_1 < 180,$$

$$-90 < \theta_2 < 180.$$

Sketch the approximate reachable workspace (an area) of the tip of link 2.