Due: 12:00pm, September 20th, 2016

1. Draw the workspaces for the following planar robots:

(a) The PPR manipulator shown in Figure 1 with $d = 0.05$m, and joint motion ranges of 0.1m $\leq a \leq 0.3$m, -0.2m $\leq b \leq 0.2$m and $270° \leq c \leq 360°$.

(b)The PRR robot shown in Figure 2 with $b = 0.5$m, $e = 0.1$m, and joint motion ranges of 0.1m $\leq a \leq 0.6$m, $-45° \leq c \leq 90°$ and $120° \leq d \leq 240°$.

2. For RRR planar robot shown in Figure 3, assume each joint is capable of full rotation (i.e., $0°$ to $360°$). If the link lengths are $l_1 = 1$m, $l_2 = 0.7$m and $l_3 = 0.1$m. Draw the workspace.
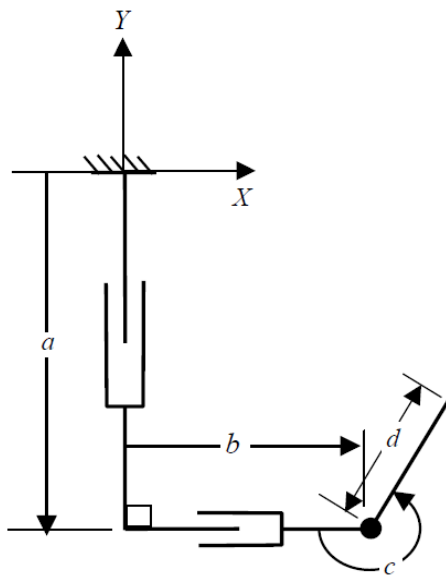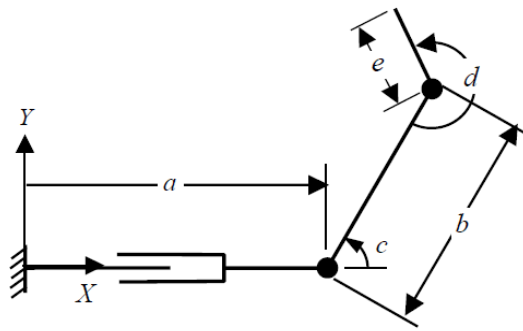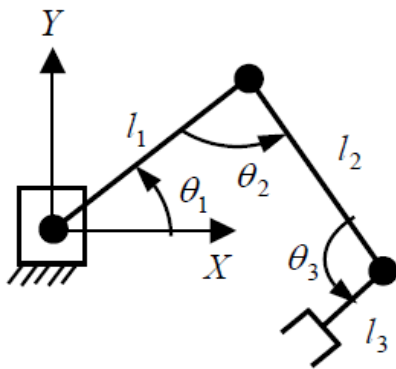

Figure 1. Planar PPR manipulator

Figure 2. Planar PRR manipulator

Figure 3. Planar 3R manipulator