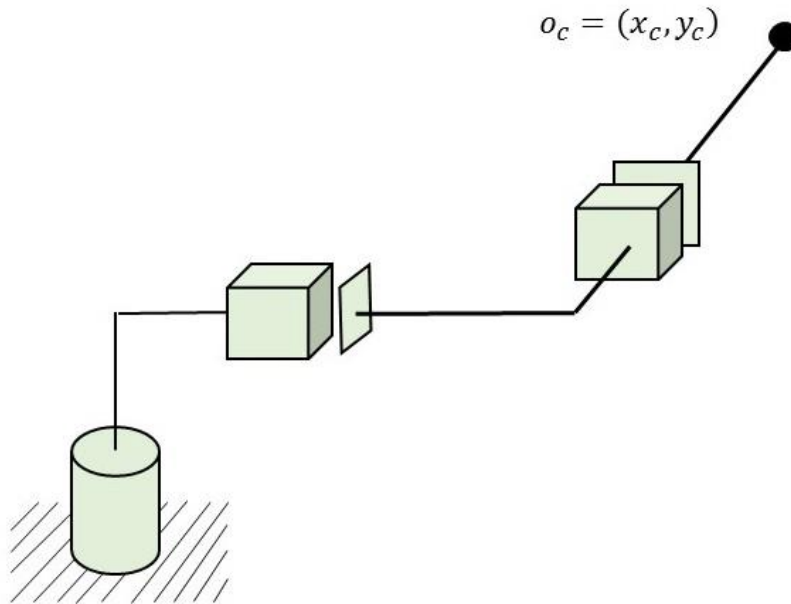


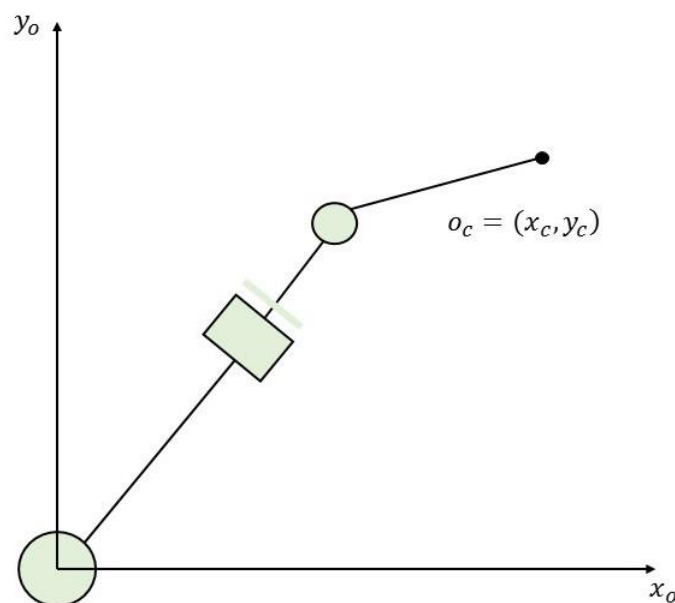
## HW #3 due Feb. 23

**Discrete Grading Policy.** 5 points for each: 2 points for trying, 3 points if partial answer, 5 point if correct.  
*Parameters and variables are generally defined by DH convention.*

1. Given a wrist center  $o_c$ , find the inverse position kinematics ( $d_2, d_3 \geq 0, 0 \leq \theta_1 \leq 90^\circ$ ).



2. Given a wrist center  $o_c$ , how many solutions are there to the inverse position kinematics? Where does the number of solutions change? ( $0 \leq \theta_i \leq 360^\circ, d_2 > r_3$ )



3. Given a wrist center  $o_c$ , with  $r_1 = 5, r_2 = 3, r_3 = 1$ , how many solutions are there to the inverse position kinematics? Where does the number of solutions change? ( $0 \leq \theta_i \leq 360^\circ, i=1, 2, 3$ )

