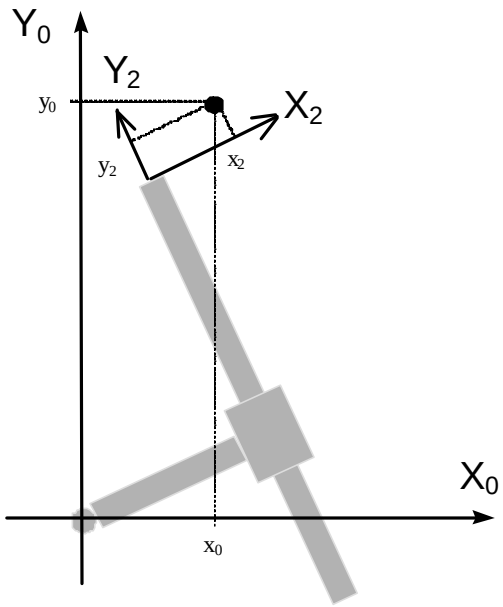
Due: Friday, 9/14/01

1. A two link, planar robot is shown, along with the forward kinematics equations. If you are given the desired end-effector coordinates (x_0, y_0, z_0) and the offsets for the end-effector (x_2, y_2, z_2), what are the inverse kinematics equations for the joint variables θ_1 and d_2?



$x_0 = c_1 x_2 - s_1 y_2 - s_1 d_2 + c_1 a_1$

$y_0 = s_1 x_2 + c_1 y_2 + c_1 d_2 + s_1 a_1$

$z_0 = z_2$

2. Find the forward kinematic solution for the parameters below, then substitute into your answers for #1 as a check:

Joint	q_I	d_i	a_i	α_i
1	45°	0	2	270°
2	0	4	0	90°

3. Find the forward kinematic solution for the parameters below, then substitute into your answers for #1 as a check:

Joint	q_I	d_i	a_i	α_i
1	330°	0	2	270°
2	0	6	0	90°