

Homework 6 Kristian Ornelas

1) $p_x = 0.5m, p_y = 0.5m, a_1 = 0.8m, a_2 = 0.5m$

$$\cos \theta_2 = \frac{0.5^2 + 0.5^2 - 0.8^2 - 0.5^2}{2(0.8)(0.5)} = \boxed{-0.4875}$$

$$\sin \theta_2 = \pm \sqrt{0.7623}$$

For $\sin \theta_2 = +\sqrt{0.7623}$

$$\theta_2 = \text{atan2}(\sqrt{0.7623}, -0.4875)$$

$$\boxed{\theta_2 = 119.18^\circ}$$

$$\theta_1 = \text{atan}(0.5, 0.5) - \text{atan2}(0.5 \cdot \sqrt{0.7623}, 0.8 + 0.5 \cdot -0.4875)$$

$$\boxed{\theta_1 = 6.875^\circ}$$

For $\sin \theta_2 = -\sqrt{0.7623}$

$$\theta_2 = \text{atan2}(-\sqrt{0.7623}, -0.4875)$$

$$\boxed{\theta_2 = 119.18^\circ}$$

$$\theta_1 = \text{atan2}(0.5, 0.5) - \text{atan2}(0.5(-\sqrt{0.7623}), 0.8 + 0.5(-0.4875))$$

$$\boxed{\theta_1 = 83.13^\circ}$$

2) See attached printouts for python script and results.

$$\theta_2 \text{ with initial guess 1: } \boxed{119.18^\circ}$$

$$\theta_1 \text{ with initial guess 1: } \boxed{6.874^\circ}$$

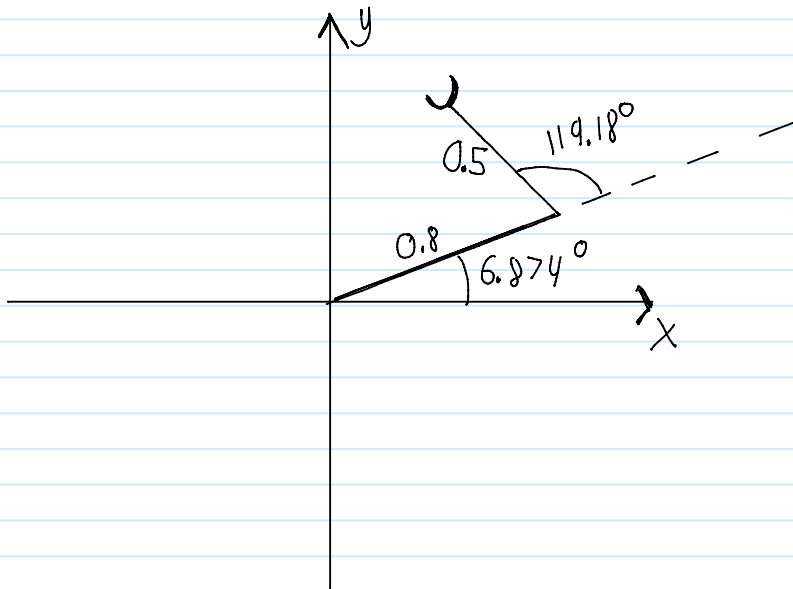
Solution 1

$$\theta_2 \text{ with initial guess -1: } \boxed{-119.18^\circ}$$

$$\theta_1 \text{ with initial guess 5: } \boxed{83.13^\circ}$$

Solution 2

3) Solution 1:



Solution 2:

