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1. we know that $x = a_1 \cos\theta_1 + a_2 \cos(\theta_1 + \theta_2)$

$y = a_1 \sin\theta_1 + a_2 \sin(\theta_1 + \theta_2)$

given that $a_1 = a_2 = 1$, $\theta_1 = \pi/6$, $\theta_2 = \pi/2$

$x = 1.\cos \pi/6 + 1.\cos(\pi/6 + \pi/2)$

$y = 1.\sin \pi/6 + 1.\sin(\pi/6 + \pi/2)$

$x = \sqrt{3}/2 + -1/2 = \frac{\sqrt{3}-1}{2}$

$y = 1/2 + \sqrt{3}/2 = \frac{\sqrt{3}+1}{2}$

2. $\dot{x} = -a_1 \sin\theta_1 \cdot \dot{\theta}_1 - a_2 \sin(\theta_1 + \theta_2)(\dot{\theta}_1 + \dot{\theta}_2)$

$\dot{y} = a_1 \cos\theta_1 \cdot \dot{\theta}_1 + a_2 \cos(\theta_1 + \theta_2)(\dot{\theta}_1 + \dot{\theta}_2)$

$\dot{x} = -1.\sin\theta_1 \cdot 1 - 1.\sin(\theta_1 + \theta_2)(1+2)$

$\dot{y} = 1.\cos\theta_1 \cdot 1 + 1.\cos(\theta_1 + \theta_2)(1+2)$

when:

$\theta_1 = \theta_2 = \pi/4$ then the instantanous tool velocity will be

$\dot{x} = -\sin \pi/4 - 3 \sin \pi/2 = -1/\sqrt{2} - 3$

$\dot{y} = \cos \pi/4 + 3 \cos \pi/2 = 1/\sqrt{2}$