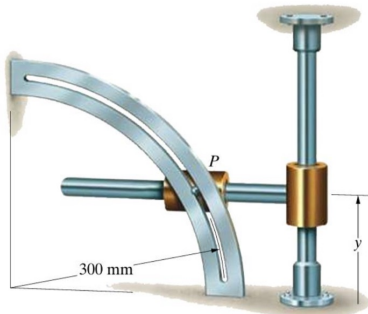13.89 If $y = 150$ mm, $dy/dt = 300$ mm/s, and $d^2y/dt^2 = 0$, what are the magnitudes of the velocity and acceleration of point P?

Problem 13.89

정답
$|v_p| = 0.3464 \, m/s$
$|a_p| = 0.4619 \, m/s^2$

※마찰력 등 모든 외력 무시
풀이과정 자세히 서술

$r = 300 \, mm$

$\theta = arcsin(0.5)$

$y = 300 \sin\theta$

$\theta = 30°$

$300 \cdot \dfrac{2\sqrt{3}}{3}$

$= 200\sqrt{3}$

$\simeq 0.3464 \, m/s$

$300 = 300 \cdot \cos\left(\dfrac{\pi}{6}\right) \cdot \dfrac{d\theta}{dt}$

$= 150\sqrt{3} \cdot \dfrac{d\theta}{dt}$

$\dfrac{d\theta}{dt} = \dfrac{2}{\sqrt{3}}$