• 例題 11.1

一輪半徑 30 cm 的車 10 秒內由靜止到 108 km/h。求：(a) 輪的角加速度為何？ (b) 轉了幾圈？(沒有滑動)；(c) 當車速為 108 km/h 時輪邊之點對輪心的徑向加速度為何？

解

(a) $t = 10$ 秒，$v = \dfrac{108\text{ km}}{1\text{ h}} = \dfrac{108{,}000\text{ m}}{3600\text{ s}} = 30\text{ m/s}$

$v = r\omega \therefore \omega = \dfrac{30}{0.3} = 100\text{ rad/s}$

$\omega = \omega_0 + \alpha t \qquad 100 = 0 + \alpha \times 10 \therefore \alpha = 10\text{ rad/s}^2$

(b) $\theta = \omega_0 t + \dfrac{1}{2}\alpha t^2 \qquad \theta = 0 + \dfrac{1}{2} \times 10 \times 10^2 = 500\text{ rad} = 79.58\text{ rev}$

(c) $a_r = r\omega^2 = 0.3 \times 100^2 = 3000\text{ m/s}$