GERAK ROTASI

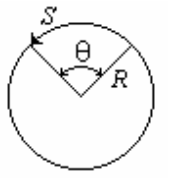
GERAK TRANSLASI		GERAK ROTASI		Hubungannya
Pergeseran linier	s	Pergeseran sudut	θ	s = θ . R
Kecepatan linier	$v = \frac{ds}{dt}$	Kecepatan sudut	$\omega = \frac{d\theta}{dt}$	v = ω . R
Percepatan Linier	$a = \frac{dv}{dt}$	Percepatan sudut	$\alpha = \frac{d\omega}{dt}$	a = α . R
Kelembaman translasi (massa)	m	Kelembaman rotasi (momen inersia)	I	$I = \sum m.r^2$
Gaya	F = m . a	Torsi (momen gaya)	λ = I . α	λ = F . R
Energi kinetik	$Ek = \frac{1}{2} m\ v^2$	Energi kinetik	$Ek = \frac{1}{2} m\ v^2$	-
Daya	P = F . v	Daya	P = λ . ω	-
Momentum linier	p = m.v	Momentum anguler	L = I .ω	-

PADA GERAK DENGAN PERCEPATAN TETAP.

GERAK TRANSLASI (ARAH TETAP)	GERAK ROTASI (SUMBU TETAP)
$v_t = v_0 + at$	$\omega t = \omega_0 + \alpha .t$
$s = v_o t + {}^1/_2\ a\ t^2$	$\theta = \omega_0 t + {}^1/_2 \alpha .t^2$
$v_t{}^2 = v_0{}^2 + 2\ a.s$	$\omega t^2 = \omega_0{}^2 + 2\alpha.\theta$

s = jarak
a = percepatan
v = kecepatan
R = jari–jari lintasan
vt = kecepatan dalam waktu t detik
vo = kecepatan awal
t = waktu yang ditempuh
ωt = kecepatan sudut dalam waktu t detik
ωo= kecepatan sudut awal

Besarnya sudut :



$\theta = \frac{S}{R}$ radian

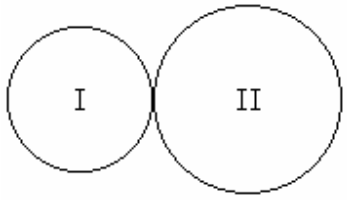
S = panjang busur

R = jari-jari

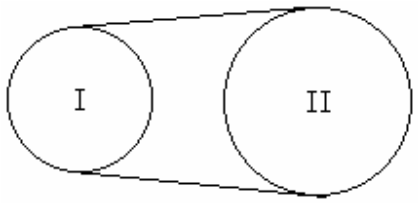
f . T = 1 $\qquad$ $f = \frac{1}{T}$

$\omega = \frac{2\pi}{T}$ atau $\omega = 2\,\pi\,f$

$v = \omega R$



$v_1 = v_2$, tetapi $\omega_1 \neq \omega_2$



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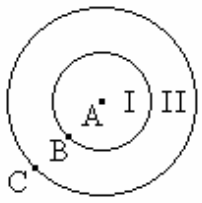
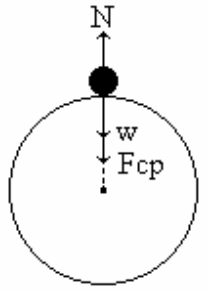


$\omega_A = \omega_R = \omega_C$, tetapi $v_A \neq v_B \neq v_C$

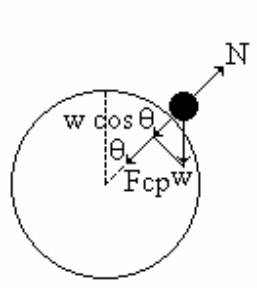
$a_r = \frac{v^2}{R}$ atau $a_r = \omega^2 R$

$F_r = m \cdot \frac{v^2}{R}$ atau $F_r = m\,\omega^2 R$

1. Gerak benda di luar dinding melingkar.

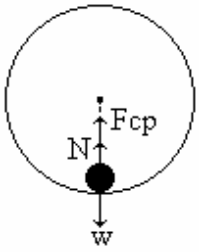


$N = m \cdot g - m \cdot \frac{v^2}{R}$

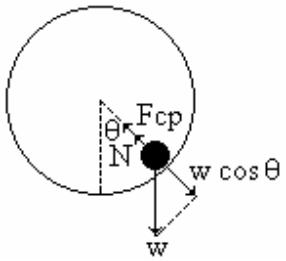


$N = m \cdot g \cos \theta - m \cdot \frac{v^2}{R}$

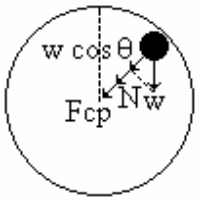
2. Gerak benda di dalam dinding melingkar.



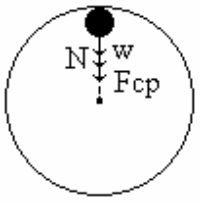
$N = m \cdot g + m \cdot \frac{v^2}{R}$



$N = m \cdot g \cos \theta + m \cdot \frac{v^2}{R}$

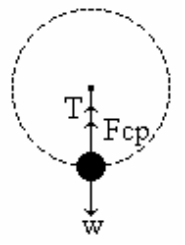


$N = m \cdot \frac{v^2}{R} - m \cdot g \cos \theta$

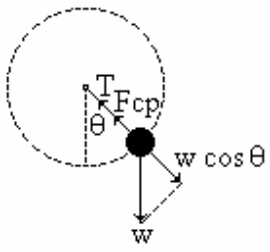


$N = m \cdot \frac{v^2}{R} - m \cdot g$

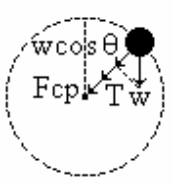
3. Benda dihubungkan dengan tali diputar vertikal.



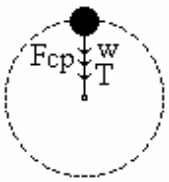
$T = m \cdot g + m \frac{v^2}{R}$



$T = m\, m \cdot g \cos \theta + m \frac{v^2}{R}$

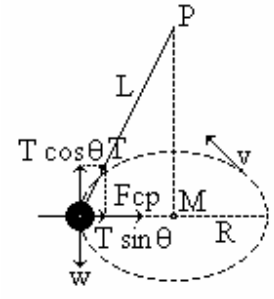


$T = m \cdot \frac{v^2}{R} - m \cdot g \cos \theta$



$T = m \cdot \frac{v^2}{R} - m \cdot g$

4. Benda dihubungkan dengan tali diputar mendatar (ayunan centrifugal/konis)



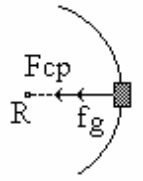
$T \cos \theta = m \cdot g$

$T \sin \theta = m \cdot \frac{v^2}{R}$

Periodenya $T = 2\pi \sqrt{\frac{L \cos\theta}{g}}$

Keterangan : R adalah jari-jari lingkaran

5. Gerak benda pada sebuah tikungan berbentuk lingkaran mendatar.



$N \cdot \mu_k = m \cdot \frac{v^2}{R}$

N = gaya normal

N = m . g