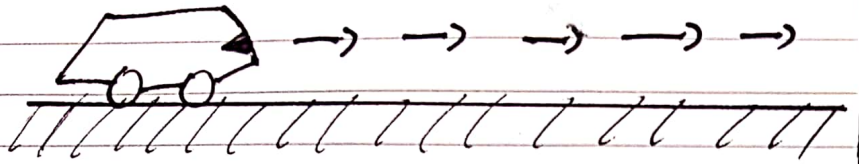
No.

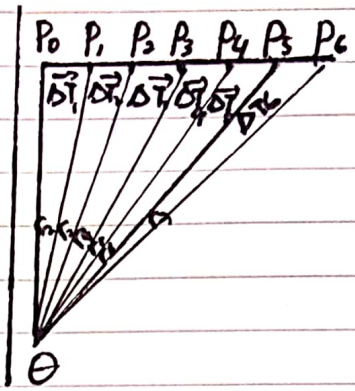
Date

Uji Pehamahaman 1.

Nama : Putri Asnaul Karimah
NPM : 2013022014
Kelas : B

1. GLB





$P_0, P_1, P_2, P_3, P_4, P_5, P_6$ merupakan posisi benda saat $t, t_1, t_2, t_3, t_4, t_5, t_6$ dg vektor posisi terhadap O yaitu $\vec{r}_1, \vec{r}_2, \vec{r}_3$ ... dan perpindahan $\Delta T_1, \Delta T_2, \Delta T_3$ ...

ΔT_1 ditempuh dg waktu $\Delta t_2 = t_1 - t$

ΔT_2 ditempuh dg waktu $\Delta t_2 = t_2 - t_1$, dst.

- Karena benda bergerak lurus beraturan, maka :

$\Delta T_1 = \Delta T_2 = \Delta T_3 = \dots = \Delta T$ } konstan
$\Delta t_1 = \Delta t_2 = \Delta t_3 = \dots = \Delta t$ }

- persamaan untasan titik P → $\vec{r} = \vec{r_0} + \Delta\vec{r} = r_0 + \Delta\vec{r}\,\hat{e}r$

$\hat{e}r$ = Vektor satuan perpindahan $\Delta\vec{r}$

$\Delta\vec{r}$ = tetap dalam selang waktu Δt yang sama

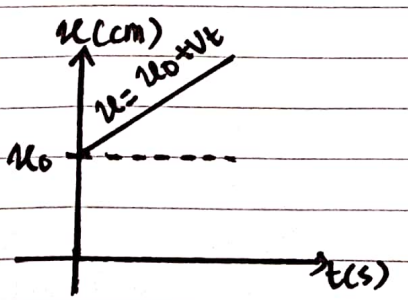
kecepatan gerak dalam selang Δt → $V = \boxed{\frac{\Delta r}{\Delta t}}$ = konstan, $\Delta r = V \cdot \Delta t$

sehingga vektor posisi menjadi $\vec{r} = \vec{r_0} + \boxed{\frac{\Delta r}{\Delta t}}\, Vt\,\hat{e}r$

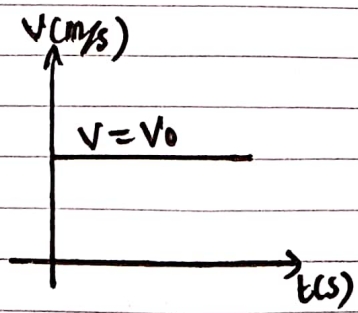
$x(t) = V(x) \cdot t$ atau $y(t) = V_y \cdot t$

$V(t) = \frac{dx(t)}{dt} = V_x = c$ = konstan

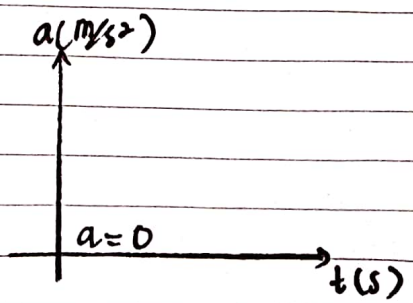
$a_t = \frac{dV_t}{dt} = \frac{d(c)}{dt} = 0$



grafik x-t



grafik V-t



grafik a-t

No.

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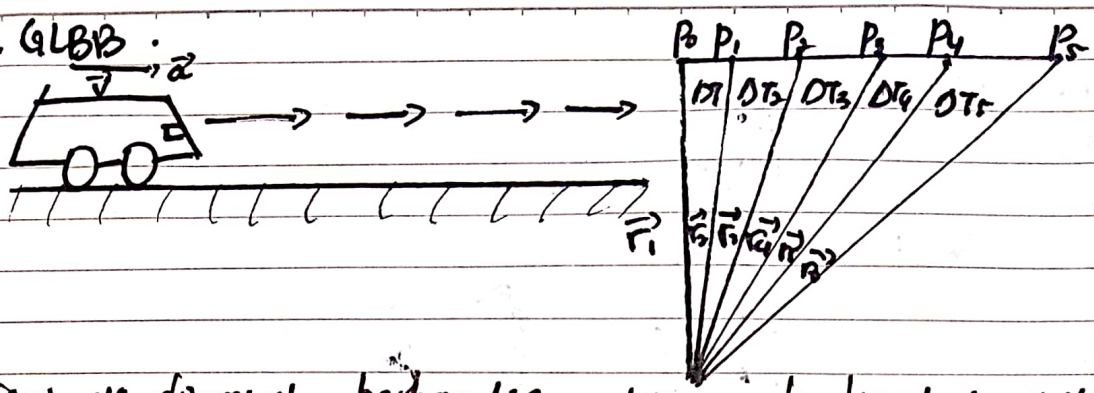
2. GLBB :



Jarak yg ditempuh berbanding lurus dg kuadrat waktu, maka ; $x = ct^2$. C = konstanta tak bergantung pada waktu. persamaan lintasan titik p

$P = \vec{r_0} + \Delta\vec{r} = \vec{r_0} + ct^2\hat{i}$

karena lintasan lurus, maka ditulis tanpa vektor :

$x_t = x_0 + ct^2$.

persamaan kecepatan benda $v_t = \frac{dx}{dt} = 2ct$

persamaan percepatan benda $a_t = \frac{dv_t}{dt} = 2c$

tetapi jika benda bergerak dg kecepatan awal V_0 maka persamaannya menjadi,

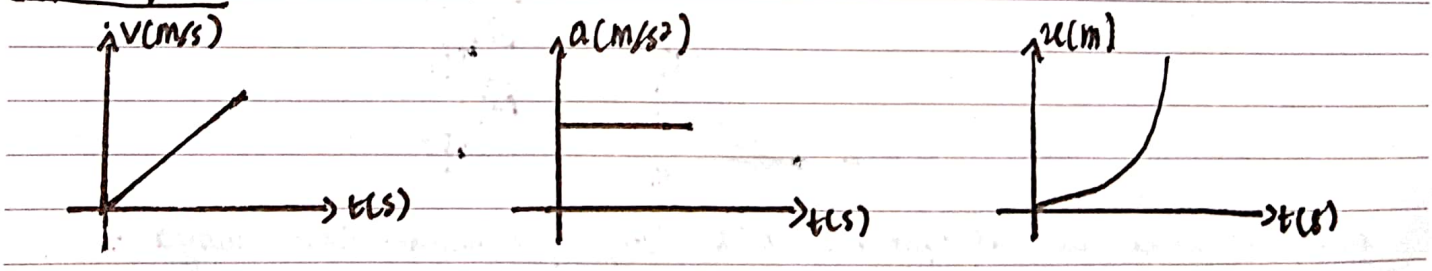
$x = x_0 + v_0 t + \frac{1}{2}at^2$ $\quad s = s_0 + v_0 t + \frac{1}{2}at^2$

$v_x = v_0 + at$ $\quad v = v_0 + at$

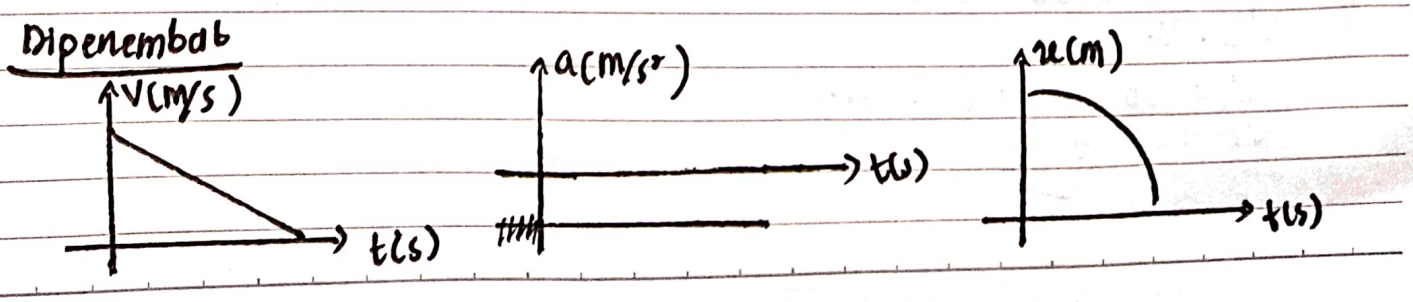
$v_x^2 = v_0^2 + 2a(x - x_0)$ atau $v_t^2 = v_0^2 + 2a(s - s_0)$

$v(t) = \frac{v_0 + v_x}{2}$ $\quad v_r = \frac{v_0 + v}{2}$

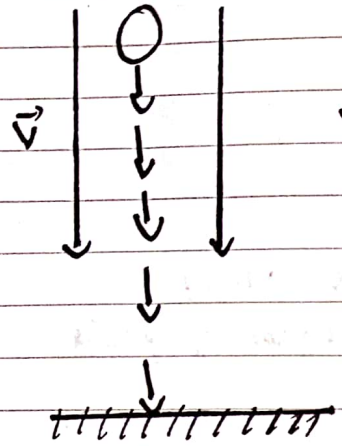
Dipercepat



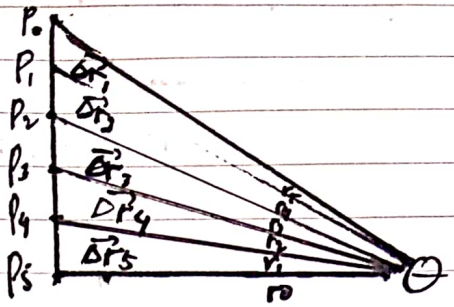
Dipercepat



3. Gerak Vertikal ke bawah



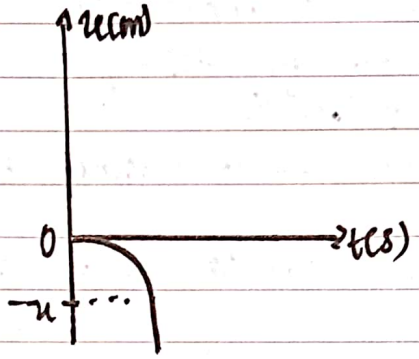
$v \neq 0$

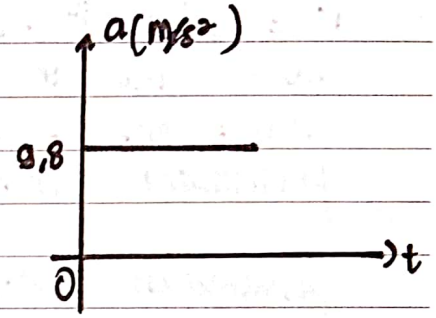


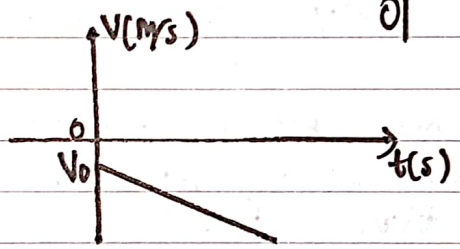
$v_t = v_0 + gt$

$v_t^2 = v_0^2 + 2gh$

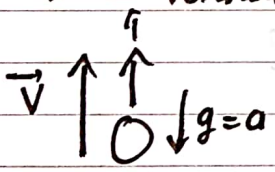
$h = v_0 t + \frac{1}{2} g t^2$

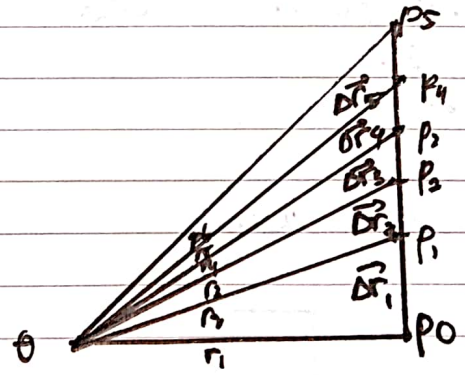






4. Gerak Vertikal keatas





Ketika bergerak dg kecepatan awal V_0, persamaan untuknya :

$x = x_0 + v_0 t + \frac{1}{2} a t^2$

$V_x = V_0 + a$

$V_x^2 = V_0^2 + 2a(x - x_0)$

$V_r = \frac{V_0 + V_x}{2}$

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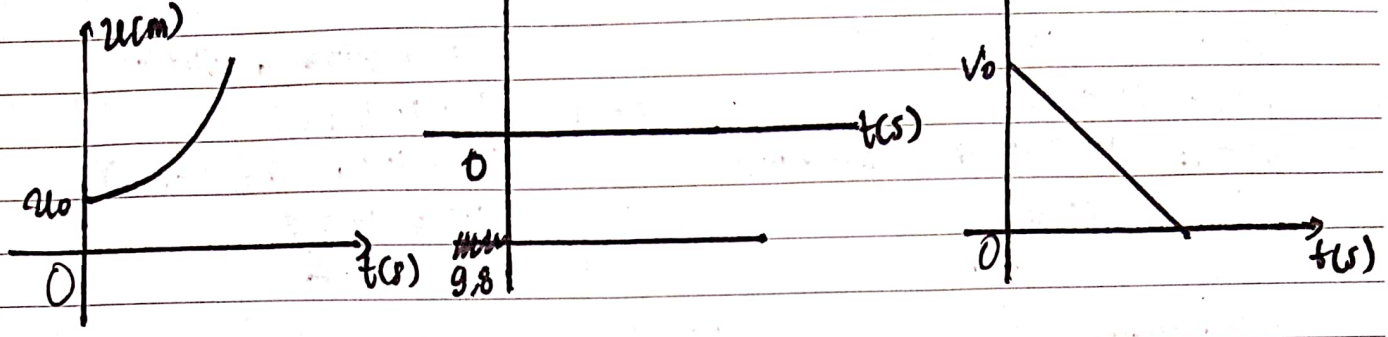
Ketika benda bergerak tanpa kecepatan awal $V_0 = 0$ persamaanya :

$x = x_0 + \frac{1}{2}at^2$

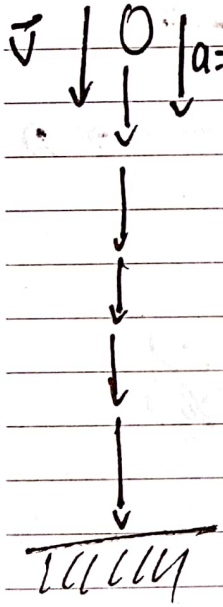
$V_x = at$

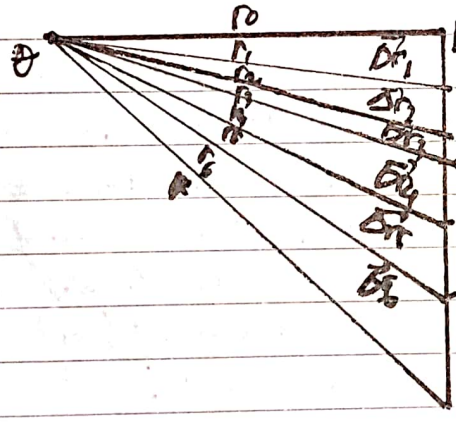
$V_x^2 = 2a(x - x_0)$



5. Gerak jatuh bebas

$V_0 = 0$





Jarak berbanding lurus dengan kuadrat waktu $y = ct^2$ (c=konstan).

persamaan lintasan

$\vec{r} = \vec{r_0} + \vec{\Delta r} = \vec{r_0} + ct^2\hat{j}$

dapat ditulis tanpa tanda vektor

$y = y_0 + ct^2$

Persamaan kecepatan benda

$V_y = \frac{dy}{dt} = 2ct$.

Persamaan percepatan benda : $a_y = \frac{dv_y}{dt} = 2c = g \rightarrow c = \frac{1}{2}g$

Persamaan lintasan benda jatuh bebas menjadi

$y = y_0 + \frac{1}{2}gt^2$, $V_y = gt$, $a_y = g = 9{,}8\ m/s^2$.

Jika ditinjau pada titik tinjau yang berhimpit dg P_0

$y = \frac{1}{2}gt^2$ dan $V_y = gt$

Jadi, $t = \frac{V_y}{g}$, $V_y^2 = 2gy$ atau $V_y = \sqrt{2gy}$

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Benda jatuh bebas ($V_0 = 0$)

$x = x_0 + \frac{1}{2}at^2$ atau $s = s_0 + \frac{1}{2}at^2$

$V_x = at$ atau $V = at$

$V_x^2 = 2a(x - x_0)$ atau $V^2 = 2a(s - s_0)$

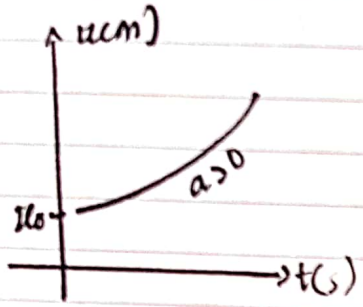
Benda jatuh bebas (V_0)

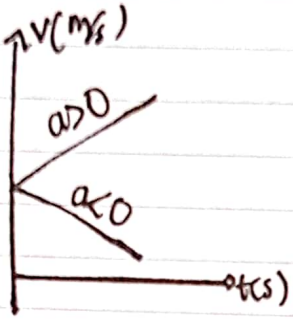
$x = x_0 + v_0t + \frac{1}{2}at^2$ atau $s = s_0 + v_0t + \frac{1}{2}at^2$

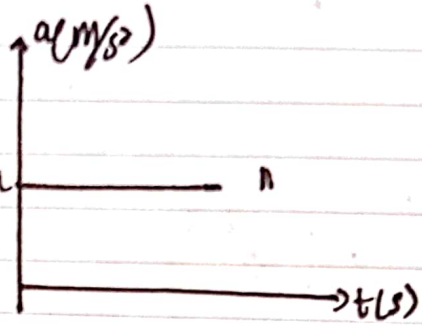
$V_x = V_0 + at$ atau $V = V_0 + at$

$V_x^2 = V_0^2 + 2a(x - x_0)$ atau $V^2 = V_0^2 + 2a(s - s_0)$

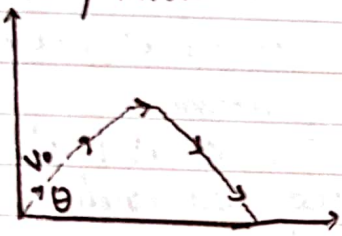
$V_r = \frac{V_0 + V_x}{2}$ atau $V_r = \frac{V_0 + V}{2}$







6. Gerak parabola



Ket :

V_0 = kecepatan awal (m/s)

V_x = kecepatan arah sumbu x (m/s)

V_y = kecepatan arah sumbu y (m/s)

x = posisi disumbu x (m)

y = posisi disumbu y (m)

θ = sudut elevasi

g = percepatan gravitasi (m/s^2)

Kecepatan disembarang titik

$V = \sqrt{(V_x)^2 + (V_y)^2}$	Kecepatan (V_x, V_y)	
	Sumbu x	Sumbu y
Kondisi awal	$V_0 \cos\theta$	$V_0 \sin\theta$
Saat t sekon	$V_0 \cos\theta$	$V_0 \sin\theta$

Kecepatan saat t sekon

	Kedudukan (x, y)		Waktu yang diperlukan
	Sumbu x	Sumbu y	
Kedudukan awal	0	0	~~0~~
Saat t sekon	$x = V_0 \cos\theta t$	$y = V_0 \sin\theta \cdot t - \frac{1}{2}gt^2$	t
pd titik tertinggi	$x = \frac{V_0 \sin 2\theta}{g}$	$y_{max} = \frac{V_0 \sin 2\theta}{2g}$	$t = \frac{V_0 \sin\theta}{g}$
pd titik terendah	$x_{max} = \frac{V_0 \sin 2\theta}{g}$	0	$t = \frac{V_0 \sin\theta}{g}$