No.

Date . .

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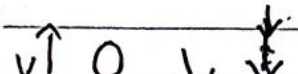
Kelas : B



Hukum 2 Newton

$\sum f = m.a$

$\vec{w} + F = -m\vec{a}$

$(mg + 6v)\vec{y} = -m\vec{a}\vec{y}$

$(mg + 6v) = -m\vec{a}$ $\left(\times \frac{1}{na}\right)$

$g + \frac{6v}{m} = a$

Substitusi nilai a

$g + \frac{6}{m}v = \frac{-d^2y(t)}{dt}$

$g + \frac{6v}{m} = -\frac{dv}{dt}$

$\frac{dv}{g + \frac{6}{m}v} = dt$

$\int_{v6}^{v(t)} \frac{dv}{g + \frac{6}{m}v} = \int_0^t dt$

misal : $g + \frac{6}{m}v : v$

$= \frac{6}{m}dv = dv$

$dv = \frac{m}{6}dv$

maka

$\int_{v_0}^{v(t)} \frac{1}{u}du = \int_0^t dt$

$\int_{v_0}^{v(t)} \frac{1}{u}\left(\frac{m}{6}du\right) = \int_0^t dt$

$-\frac{m}{6}\ln(u) = t$

$-\frac{m}{6}\ln\left|g + \frac{6}{m}v\right|_{v_0}^{v(t)}$

$= \frac{m}{6}\ln\left|g + \frac{6}{m}v(t)\right| - \ln\left|g + \frac{6}{m}(v_0)\right|$

$\ln\left|\frac{g + \frac{6}{m}(vt)}{g + \frac{6}{m}(v_0)}\right| = -\frac{6}{m}t$

ex : $\left(\ln\left|\frac{g + \frac{6}{m}v(t)}{g + \frac{6}{m}v_0}\right|\right) =$

$\epsilon = \frac{-6t}{m}$

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$g + \frac{6}{m} v(t) = e^{\frac{-6t}{m}}$

$g + \frac{6}{m} v_0$

$g + \frac{6}{m} v(t) = (g + \frac{6}{m} v_0) e^{\frac{-6t}{m}}$

$\frac{6}{m} v(t) = (g + \frac{6}{m} v_0) e^{\frac{-6t}{m}} - g(x - \frac{m}{6})$

$v(t) = \frac{m}{6} (g + \frac{6}{m} v_0) e^{\frac{-6t}{m}} - g(x - \frac{m}{6}) \frac{mg}{6}$

$v(t)^2 = (\frac{mg}{6} + v_0) e^{\frac{-6t}{m}} + \frac{mg}{6}$

→ $f = w$

$6v = mg$

$v_T = mg/6$ maka :

$v(t) = (v_T + v_0) e^{\frac{-6t}{m}} - vt$

untuk $a(t)$

$a(t) = \frac{dv(t)}{dt}$

$a(t) = (v_T + v_0)(-\frac{6}{m}) e^{\frac{-6t}{m}}$

$= -\frac{6}{m} \cdot \frac{mg}{6} - \frac{6}{m} v_0) e^{\frac{-6t}{m}}$

$a(t) = (-g - \frac{6}{m} v_0) e^{\frac{-6t}{m}}$

untuk $y(t)$

$v(t) = \frac{dy(t)}{dt}$

$dy(t) = v(t) \cdot dt$

$\int_0^t v(t) = dy(t) = \int_0^t v(t) dt$

$y(t) = \int_0^t (v_T + v_0) e^{\frac{-6t}{m}} - vt$

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$y(t) = \left[\left((VT+V_0)\left(\frac{-m}{b}\right)e^{\frac{-bt}{m}} - Vt\right)^t\right]^x$

$y(t) = \left[(Vt+V_0)\left(-\frac{m}{b}\right)e^{\frac{-bt}{m}} - Vt\right] - \left[(Vt+V_0)\left(\frac{-m}{b}\right)\right]$

$y(t) = -\frac{m}{b}(Vt+V_0)(e^{-bt/m}-1) - VT\cdot t$

$y(t) = -\frac{m}{b}(Vt+V_0)(1-e^{-bt/m}) - VT\cdot t$

aproksimasi

$e^x = 1 + \frac{x}{11} + \frac{x^2}{21} + \frac{x^3}{31} + \dots$

$e^{\frac{-bt}{m}} = \left(-\frac{bt}{m} + \frac{1}{2}\left(\frac{bt}{m}\right) + \dots\right.$

$y(t) = -VT + \frac{m}{b}(Vt+V_0)\left(1-e^{-\frac{bt}{m}}\right)$

$= -VT + \frac{m}{b}(Vt+V_0)\left(1-1+\frac{bt}{m} - \frac{1}{2}\left(\frac{bt}{m}\right)^2\right]$

$= V_0t - 2gt^2 - \frac{1}{2}\frac{b}{m}V_0t^2$

untuk $b=0$ maka $v(t) = V_0 - gb$

$a(t) = \left(-g - \frac{b}{m}V_0\right)e^{\frac{-bt}{m}}$

$= \left(-g\frac{-b}{m}1+0\right)\left(1-\frac{bt}{m}\right)$

$= -g + gb/m - b/m\,V_0 + b^2V_0t)$

$a(t) = -g - b/m\,V_0\,t\left(\frac{b^2}{m^2}V_0 + \frac{gb}{m}\right)$

maka $ab = 0$

$a(t) = -g$