$$a(t) = \frac{dv}{dt} \Rightarrow \int_{v_0}^{v(t)} dv = \int_{t_0}^{t} a(t)\,dt$$

$v_0 = v(t_0)$

$$\boxed{v(t) = v_0 + \int_{t_0}^{t} a(t)\,dt}$$

$$a(t) = \text{costante} = a \Rightarrow \boxed{v(t) = v_0 + a(t - t_0)}$$

moto rettilineo uniformemente accelerato

$$v(t) = \frac{dx}{dt} \Rightarrow x(t) = x_0 + \int_{t_0}^{t} v(t)\,dt$$

$$x(t) = x_0 + \int_{t_0}^{t} \left[v_0 + \int_{t_0}^{t} a(t)\,dt \right] dt =$$

$$= x_0 + \int_{t_0}^{t} v_0\,dt + \int_{t_0}^{t} \left[\int_{t_0}^{t} a(t)\,dt \right] dt$$

$$\Rightarrow \boxed{x(t) = x_0 + v_0 (t - t_0) + \int_{t_0}^{t} \left[\int_{t_0}^{t} a(t)\, dt \right] dt}$$

$$a(t) = \text{cost} = a \quad \Rightarrow$$

$$x(t) = x_0 + v_0 (t - t_0) + a \int_{t_0}^{t} \left[\int_{t_0}^{t} dt \right] dt =$$

$$= x_0 + v_0 (t - t_0) + a \int_{t_0}^{t} (t - t_0)\, dt = \qquad \begin{array}{l} t^* = t - t_0 \\ dt^* = dt \end{array}$$

$$= x_0 + v_0 (t - t_0) + a \int_{0}^{t - t_0} t^*\, dt^* =$$

$$= x_0 + v_0 (t - t_0) + a \left[\frac{1}{2} t^{*2} \right]_{0}^{t - t_0} =$$

$$\boxed{x(t) = x_0 + v_0 (t - t_0) + \frac{1}{2} a (t - t_0)^2}$$

$$t_0 = 0 \quad \Rightarrow \quad \boxed{x(t) = x_0 + v_0 t + \frac{1}{2} a t^2}$$

$v(x)\ ,\ a(x)$ $\qquad a = \dfrac{dv}{dt}$ $\qquad x = x(t)$

$v[x(t)]\ ,\ a[x(t)]$

$w = -x^2 \Rightarrow f(x) = e^{w} = f(w)$

$f(x) = e^{-x^2}$ $\qquad \dfrac{df}{dx} = f'(x) = \dfrac{df}{dw}\dfrac{dw}{dx} = \dfrac{d}{dw}(e^{w})\dfrac{d}{dx}(-x^2) =$

$= e^{w}(-2x) = -2x\, e^{-x^2}$

$g[f(x)]$ $\qquad \boxed{\dfrac{dg}{dx} = \dfrac{dg}{df}\dfrac{df}{dx}}$

$$a(x) = \frac{dv(x)}{dt} = \frac{dv}{dx}\frac{dx}{dt} = v\frac{dv}{dx}$$

$$\int_{x_0}^{x} a(x)\, dx = \int_{v_0}^{v(x)} v\, dv \qquad v_0 = v(x_0)$$

$$\Rightarrow \frac{1}{2}v^2\Big|_{v_0}^{v(x)} = \int_{x_0}^{x} a(x)\, dx$$

$$\Rightarrow \frac{1}{2}\left(v^2(x) - v_0^2\right) = \int_{x_0}^{x} a(x)\, dx$$

$$\Rightarrow \boxed{v^2(x) = v_0^2 + 2\int_{x_0}^{x} a(x)\,dx}$$

$a(x) = \text{cost} = a$

$$\boxed{v^2(x) = v_0^2 + 2a(x - x_0)}$$

$[v] = m/s$ $\qquad$ $[a] = m/s^2$