

Marcos de Referencia y visiones del Movimiento

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- Observadores y sistemas de referencia
- Descripción Gráfica del movimiento
- Movimiento relativo
- Sistemas de referencia inerciales, no inerciales y las leyes de la Dinámica

Definiciones

- Posición $\vec{r}(t)$
- Desplazamiento $\Delta\vec{r}(t) = \vec{r}_2(t) - \vec{r}_1(t)$
- Velocidad/aceleración media

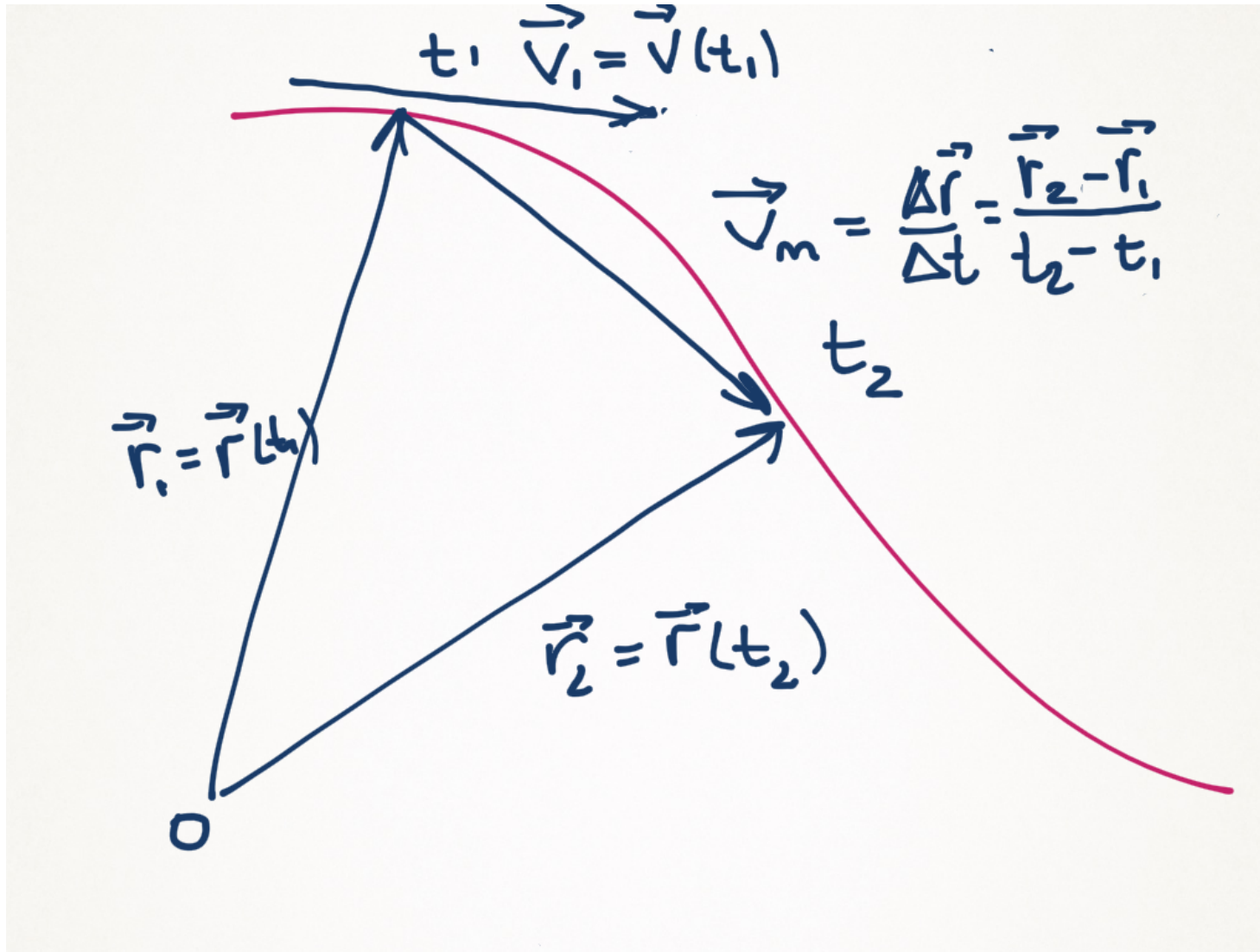
$$\vec{v}_m = \frac{\Delta\vec{r}(t)}{\Delta t} = \frac{\vec{r}_2 - \vec{r}_1}{t_2 - t_1}; \quad \vec{a}_m = \frac{\Delta\vec{v}(t)}{\Delta t} = \frac{\vec{v}_2 - \vec{v}_1}{t_2 - t_1};$$

- Velocidad/aceleración instantánea

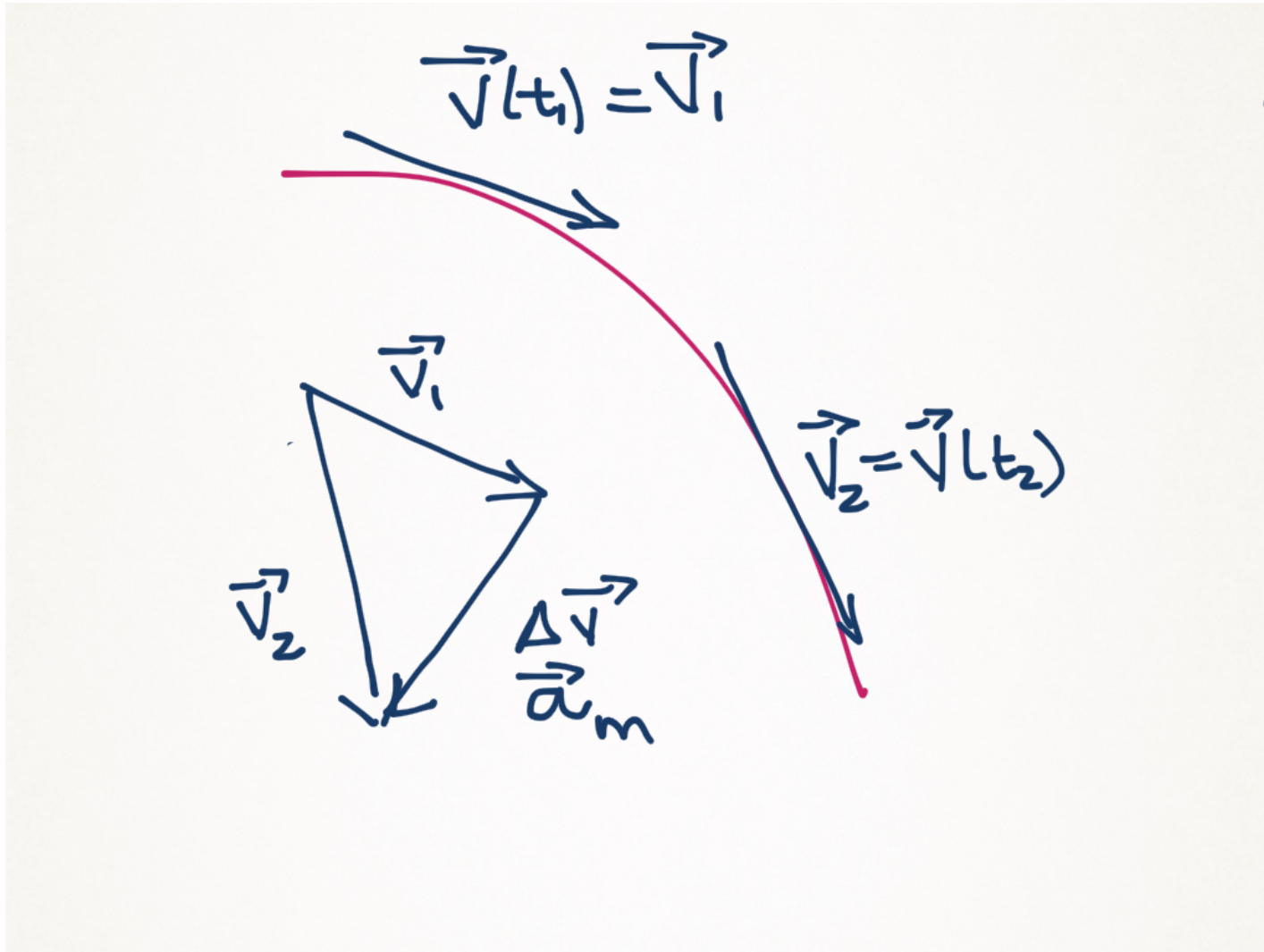
$$\vec{v} = \frac{d\vec{r}}{dt} = \lim_{\Delta t \rightarrow 0} \frac{\Delta\vec{r}(t)}{\Delta t} = \lim_{\Delta t \rightarrow 0} \frac{\vec{r}(t + \Delta t) - \vec{r}(t)}{\Delta t}$$

$$\vec{a} = \frac{d\vec{v}}{dt} = \lim_{\Delta t \rightarrow 0} \frac{\Delta\vec{v}(t)}{\Delta t} = \lim_{\Delta t \rightarrow 0} \frac{\vec{v}(t + \Delta t) - \vec{v}(t)}{\Delta t}$$

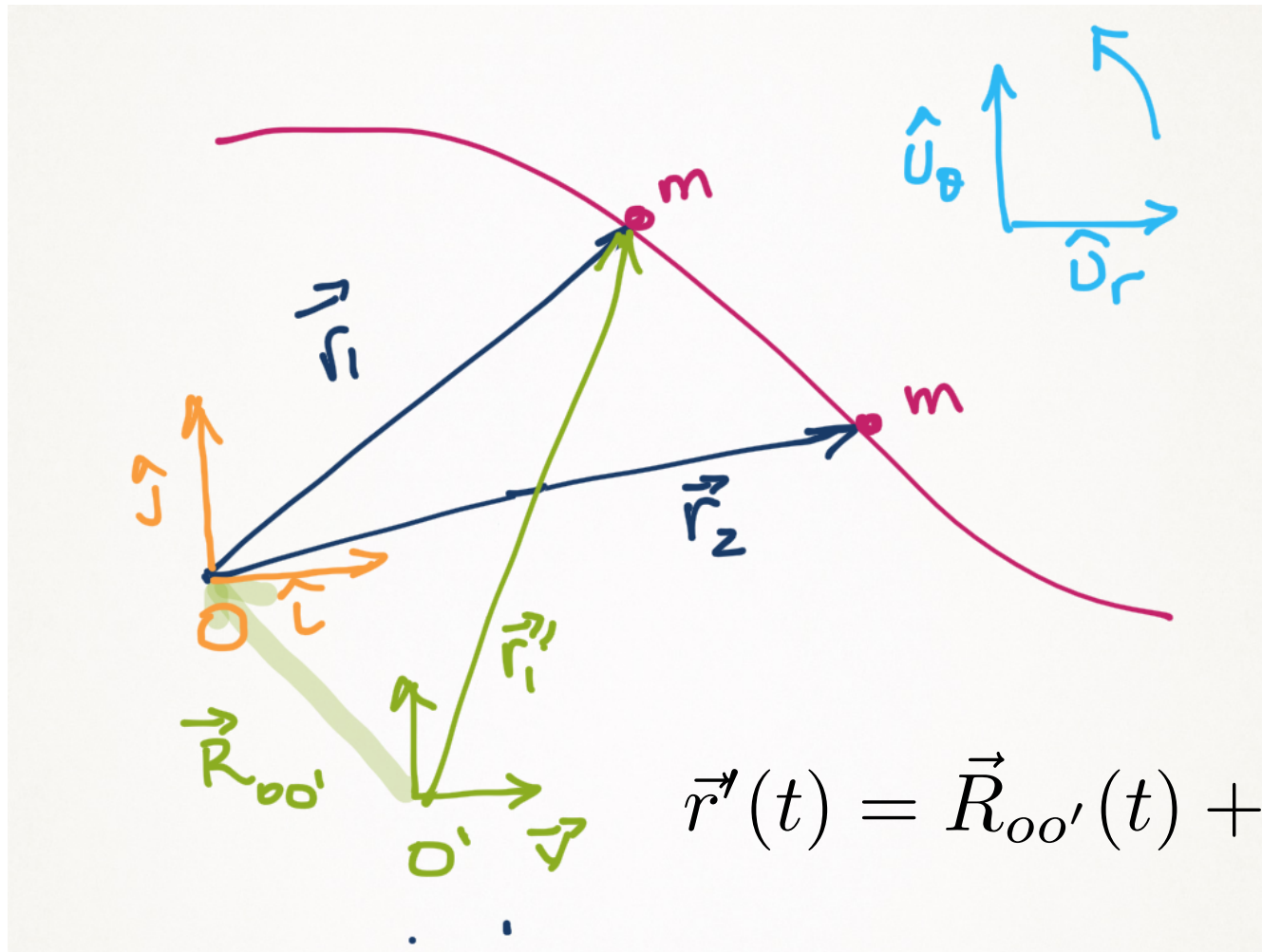
Definiciones



Definiciones



Observadores y sistemas de referencia

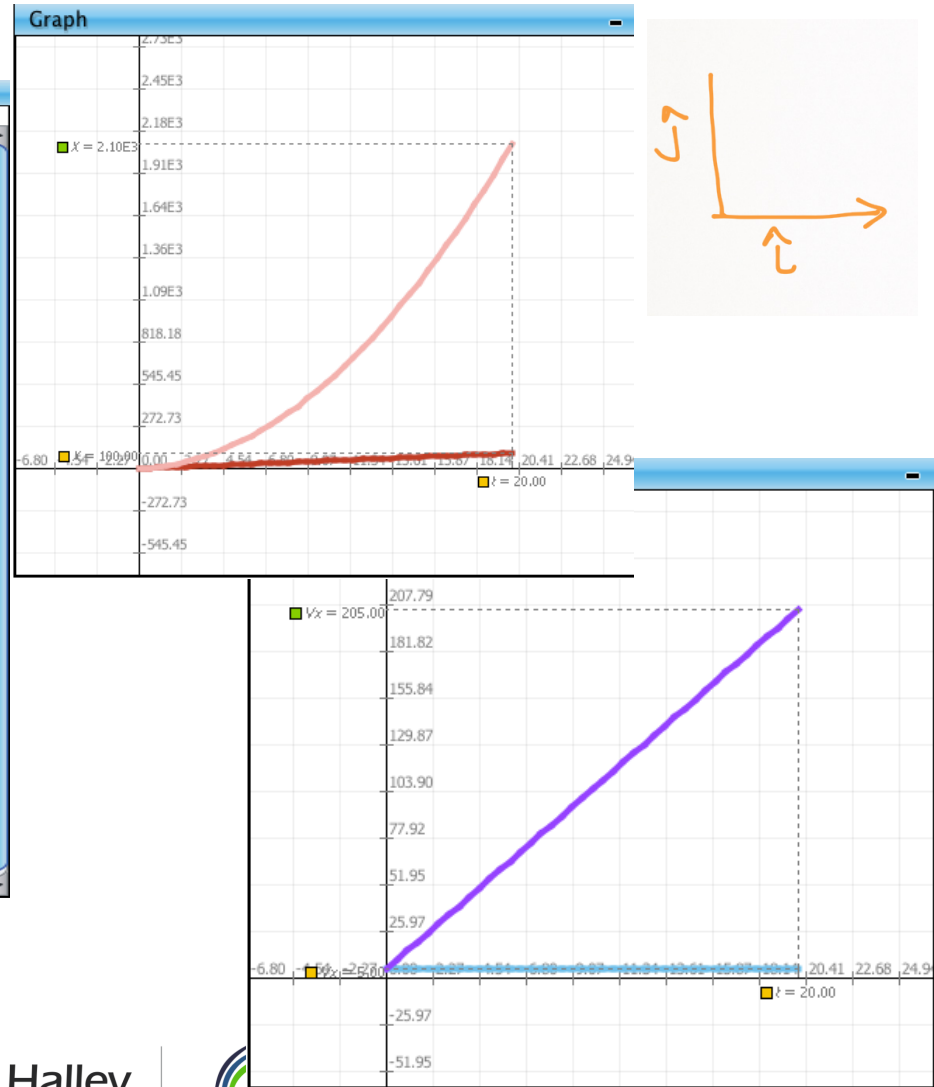


Movimiento 1D: descripción gráfica

$$x(t) = x_0 + v_{x0}t + a_x \frac{t^2}{2}$$

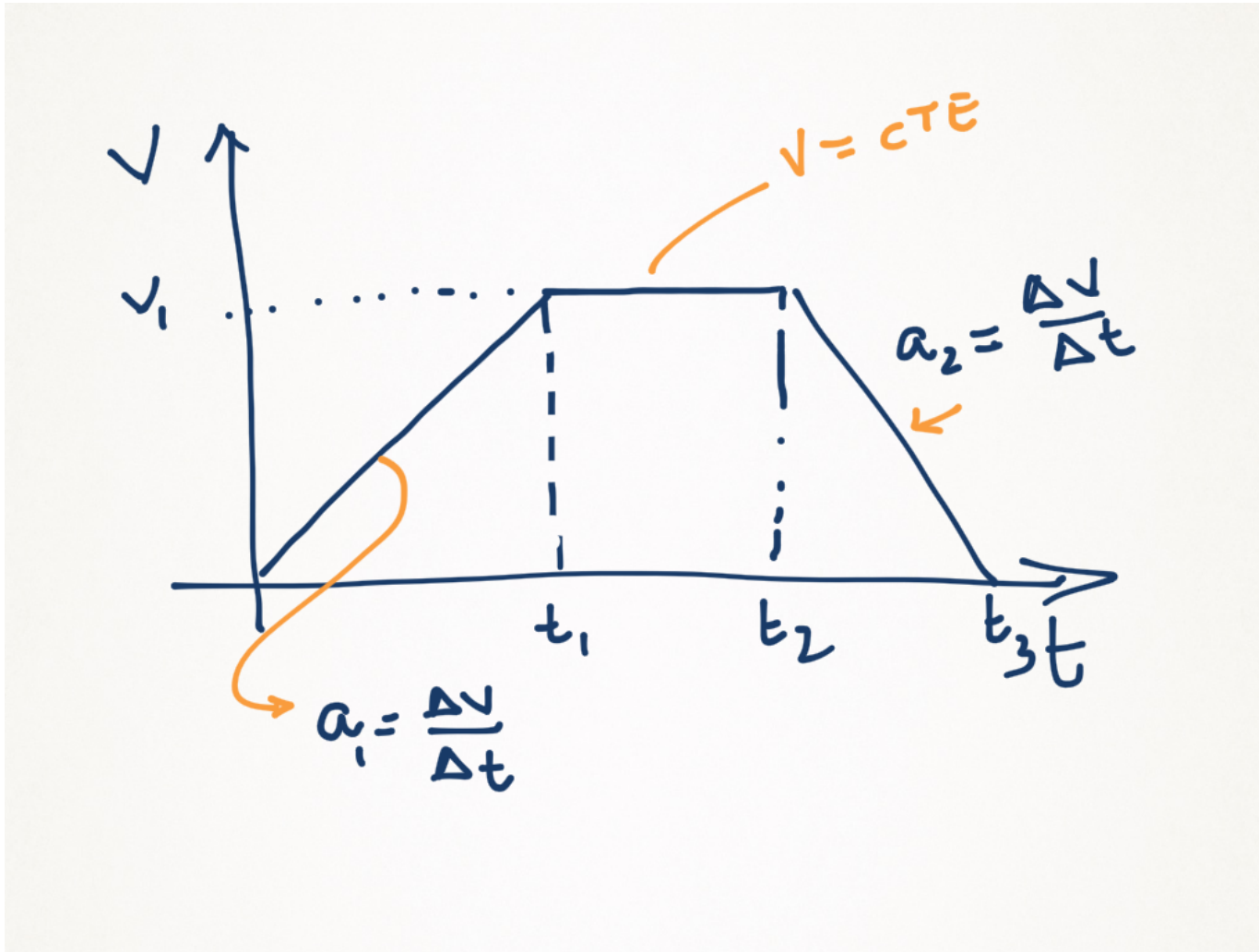
$$v_x = v_{0x} + a_x t$$

t	v _x	x	v _x	x
0.00	5.00	0.00	5.00	0.00
0.50	5.00	2.50	10.00	3.75
1.00	5.00	5.00	15.00	10.00
1.50	5.00	7.50	20.00	18.75
2.00	5.00	10.00	25.00	30.00
2.50	5.00	12.50	30.00	43.75
3.00	5.00	15.00	35.00	60.00
3.50	5.00	17.50	40.00	78.75
4.00	5.00	20.00	45.00	100.00
4.50	5.00	22.50	50.00	123.75
5.00	5.00	25.00	55.00	150.00
5.50	5.00	27.50	60.00	178.75
6.00	5.00	30.00	65.00	210.00
6.50	5.00	32.50	70.00	243.75
7.00	5.00	35.00	75.00	280.00
7.50	5.00	37.50	80.00	318.75
8.00	5.00	40.00	85.00	360.00
8.50	5.00	42.50	90.00	403.75
9.00	5.00	45.00	95.00	450.00
9.50	5.00	47.50	100.00	498.75
10.00	5.00	50.00	105.00	550.00
10.50	5.00	52.50	110.00	603.75
11.00	5.00	55.00	115.00	660.00
11.50	5.00	57.50	120.00	718.75
12.00	5.00	60.00	125.00	780.00
12.50	5.00	62.50	130.00	843.75
13.00	5.00	65.00	135.00	910.00
13.50	5.00	67.50	140.00	978.75
14.00	5.00	70.00	145.00	1050.00
14.50	5.00	72.50	150.00	1123.75
15.00	5.00	75.00	155.00	1200.00
15.50	5.00	77.50	160.00	1280.00
16.00	5.00	80.00	165.00	1363.75
16.50	5.00	82.50	170.00	1450.00
17.00	5.00	85.00	175.00	1540.00
17.50	5.00	87.50	180.00	1633.75
18.00	5.00	90.00	185.00	1730.00
18.50	5.00	92.50	190.00	1830.00
19.00	5.00	95.00	195.00	1933.75
19.50	5.00	97.50	200.00	2040.00
20.00	5.00	100.00	205.00	2150.00



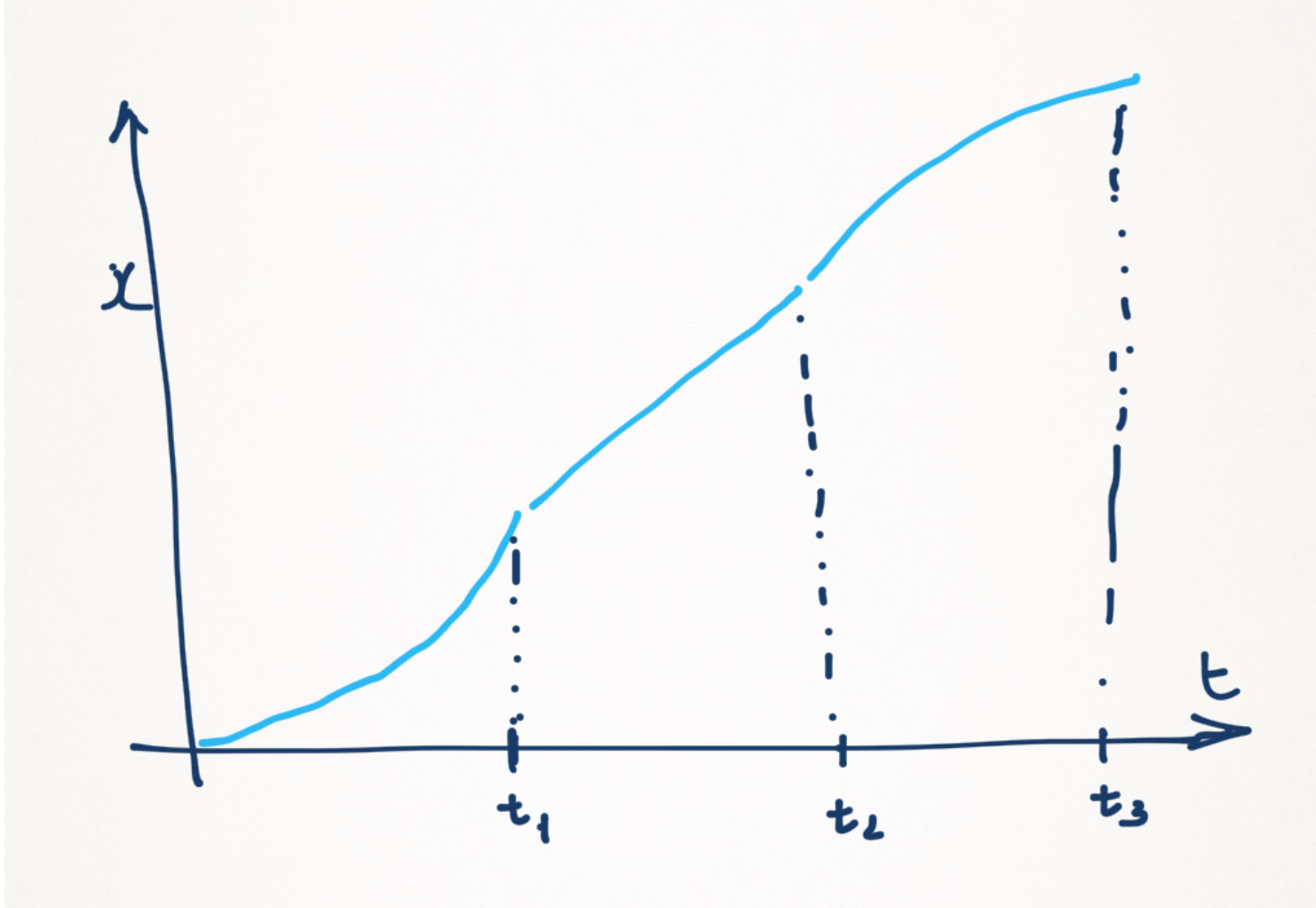
Movimiento 1D: descripción gráfica

$$v_x = v_{0x} + a_x t$$



Movimiento 1D: descripción gráfica

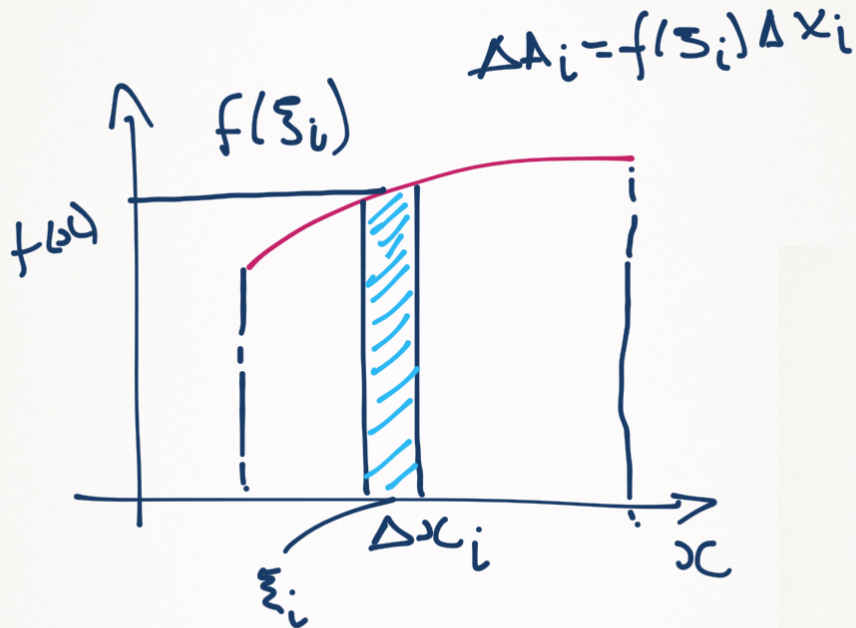
$$x = \int_0^t v_x dt = x_0 + v_x t = \int_0^t (v_0 + a_x t) dt = x_0 + v_0 t + a_x \frac{t^2}{2}$$



Movimiento 1D: descripción gráfica

$$\int_0^t f(x) dx = \lim_{\Delta x \rightarrow 0} \sum_i f(\xi_i) \Delta x_i$$

Área bajo la curva



$$x(t) = a_x \frac{t^2}{2}$$

$$x(t) = x_0 + v_{x0} t$$

