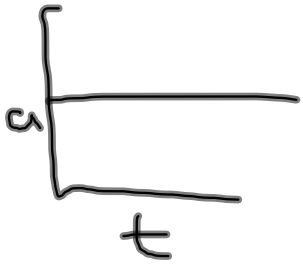
/usr/local/bin/bullet

/usr/local/src/bullet-2.77

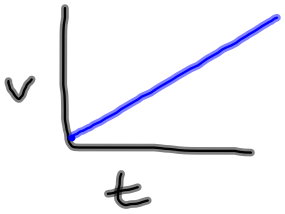
acc

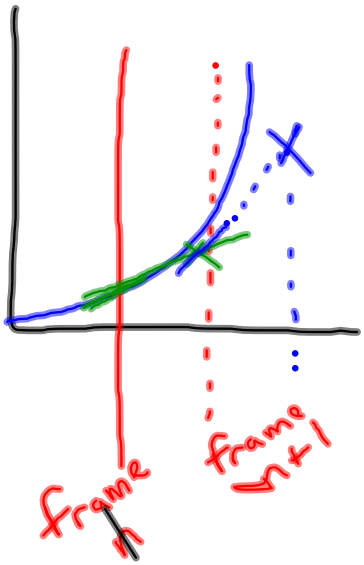


$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

pos

vel





$$x(f_2) = x(f_1) + v(f_1) \cdot \Delta t$$

$$x(t)$$

$$\frac{d^n x}{dt^n} = f\left(t, x(t), \frac{dx(t)}{dt}, \frac{d^2x(t)}{dt^2}, \ldots\right)$$

Verlet integration

r : position

$$r(t_1+\Delta t) = r(t_1) + \dot{r}(t_1)\Delta t + \frac{1}{2}\ddot{r}(t_1)\Delta t^2 + \frac{1}{6}\dddot{r}(t_1)\Delta t^3 + O(\Delta t^4)$$

$$r(t_1-\Delta t) = r_1(t) - \dot{r}(t_1)\Delta t + \frac{1}{2}\ddot{r}(t_1)\Delta t^2 - \frac{1}{6}\dddot{r}(t_1)\Delta t^3 + O(\Delta t^4)$$

$$r(t_1+\Delta t) + r(t_1-\Delta t)$$

$$r(t_1+\Delta t) = 2r_1(t) - r(t_1-\Delta t) + \ddot{r}(t_1)\Delta t^2 + O(\Delta t^4)$$

t_0, t_1, t_2 are frames $\quad t_2 = t_1 + \Delta t$

$$r(t_2) = 2\cdot r_1(t_1) - r(\cancel{t_1 - \Delta t}\ t_0) + \cancel{\ddot{r}(t_1)\Delta t^2}$$

acceleration

$$f = ma$$

$$a = \frac{f}{m}$$