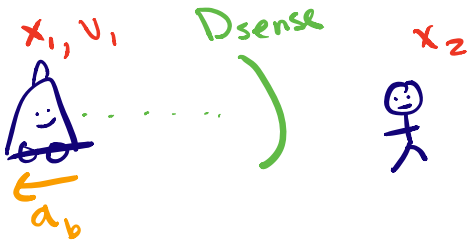
a simple model



Parameters: D_{sense}, a_b, x_{10}, x_{20}, v_{10}

initial cond.

states: x_1, x_2, v_1, s

$d \triangleq x_2 - x_1$

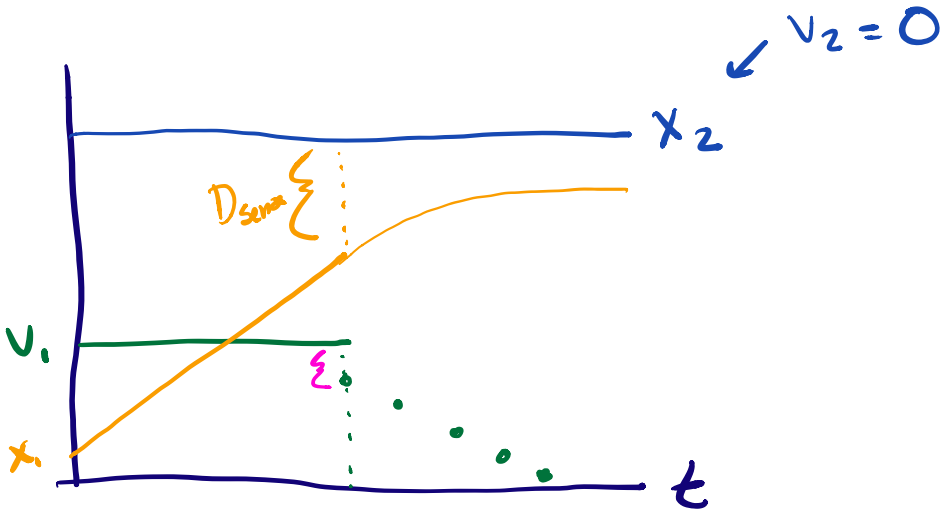
state transition rule / forward model:

$x_1 = x_1 + v_1 \cdot \Delta$ ← time step $\Delta = 1$

if $d < D_{sense}$

$v_1 = v_1 - a_b$

else $v_1 = v_1$



execution α captures a single run

↳ $x(0), x(1), \ldots$ s.t.

- $x(0)$ satisfies initial cond.
- $\forall t$, $x(t)$ transitions to $x(t+1)$ by executing SimpleCar

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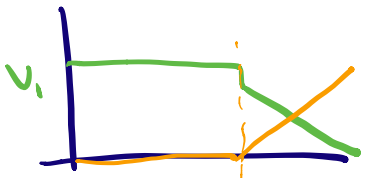
Inv 2: $\forall$ $x_{1,0}, x_{2,0}, v_0, D_{sense}, a_b$ and $\underline{\forall t}$:

$P(t) \rightarrow$ timer + $v_1/a_b \leq \frac{v_0}{a_b}$



to use induction:

① P(0) (base case) is true?

② for any t $P(t) \Rightarrow P(t+1)$

show: $P(x(0))$ ✓

$P(x(t)) \Rightarrow P(x(t+1))$

$P(\text{SimpleCar}(x(t)))$