$$\frac{dT}{dt} = -K(T - T_s)$$

$$\frac{1}{T - T_s}\frac{dT}{dt}\,dt = -K(T - T_s)\cdot\frac{1}{T - T_s}\cdot dt$$

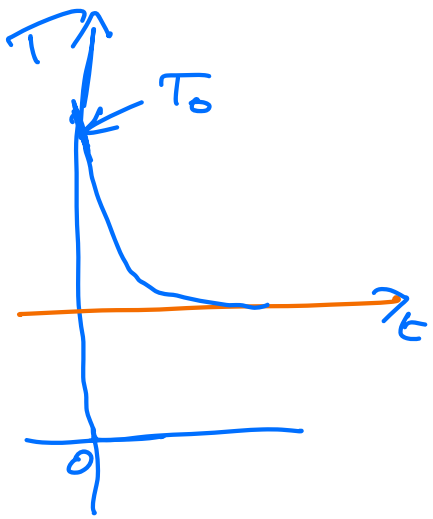
$$\int \frac{dT}{T - T_s} = \int -K\cdot dt$$

$$\exp\left(\ln|T - T_s|\right) = \exp(-Kt + C)$$

$$|T - T_s| = e^{-Kt + C}$$

$$T - T_s = e^{-Kt}\,e^{C} \quad \rightarrow C' \text{ ou } C$$

$T > T_s$



$$T = T_s + C\cdot e^{-Kt}$$

$$T(t) = T_s + C\,e^{-Kt} \rightarrow (1)$$

$$T(0) = T_0 = T_s + C\,e^{0}$$

$e^{0} = 1$

$$C = T_0 - T_s \rightarrow (2)$$

(2) IN (1) $\quad T(t) = T_s + (T_0 - T_s)\,e^{-Kt}$

TAUX DE REFROIDISSEMENT → $\left(\frac{dT}{dt} = -k(T - T_a)\right.$

CONSTANTE ↑ k

T → ALIMENTE

T_a → AMBIANCE

OBJECTIF $\boxed{T(t).}$

$$\frac{1}{T-T_a}\,dt\,\frac{dT}{dt} = -k(T-T_a)\,\frac{1}{T-T_a}\,dt$$

$$=$$

$$\int \frac{dT}{T-T_a} = \int -k\,dt$$

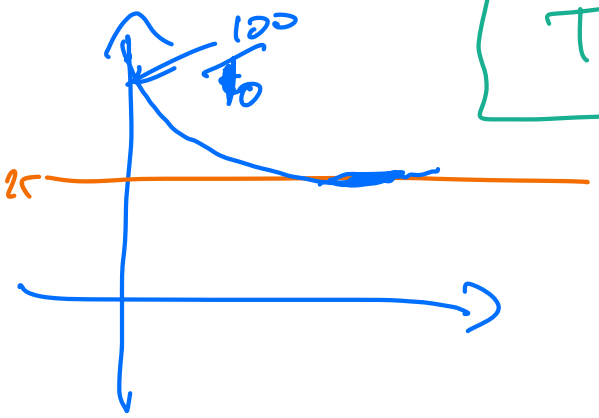
$$e^{\ln_e|T-T_a|} = e^{-kt+C}$$

$$|T-T_a| = e^{-kt+C}$$

$T > T_a$

$$T - T_a = \pm e^{-kt} \cdot e^{C}$$

$$\boxed{T - T_a = e^{-kt} \cdot C}$$



$$T(t) = T_a + C\, e^{-kt} \rightarrow (1)$$

$$T(0) = T_a + C \cdot e^{-k \cdot 0}$$

$e^{-k \cdot 0} = 1$

$$T_0 = T_a + C$$

$$C = T_0 - T_a \rightarrow (2)$$

(2) dans (1) $\Rightarrow$

$$T(t) = T_a + (T_0 - T_a)\, e^{-kt}$$