Clase 10 8 Septiembre 2021

Título de la nota 08/09/2021

X = Función

Funciones estado: H, S, G, U, A

Leyes Termodinámica 1, 2, 3

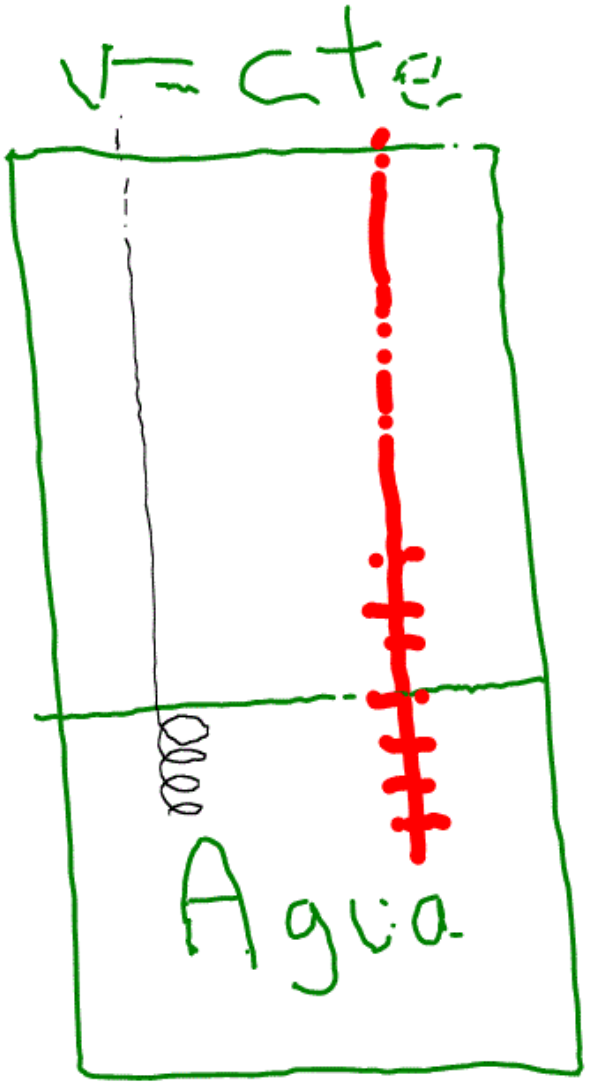
$X_1 \rightarrow X_2$

$\Delta X = X_2 - X_1$

Capacidad Calorífica

- $P = cte$ $\overline{C_P}$
- $V = cte$ $\overline{C_V}$

$$\frac{J}{mol\,K}$$



Si diabático

$q = 0$

$n = cte$

$U_2 - U_1 = \Delta U$

$\Delta U \propto \Delta T$

$$\Delta U = C_v \Delta T$$

$$= \frac{J}{mol\,K}\,(K)$$

$$\Delta U = \frac{J}{mol}$$ intensiva

$$\Delta U = nC_v \Delta T$$

$$= (mol)\left(\frac{J}{mol\,K}\right)(K) = J$$

extensivo.

Teorema Mayer

$$\bar{C}_p - \bar{C}_v = R$$

$$\bar{C}_v = \bar{C}_p - R$$

$$\bar{C}_p = \bar{C}_v + R$$

$PV = nRT$

perfecto: $\bar{C}_p$ y $\bar{C}_v$ = ctes; gases monoatómicos

ideal: $\bar{C}_p$ y $\bar{C}_v$; $f(T)$

entalpía (H)

$q_p = \Delta H$.

$q_v = \Delta U$.

gases y vapores $\bar{C}_p > \bar{C}_v$

líquidos sólidos $\bar{C}_p \approx \bar{C}_v$

$$pV = nRT$$

$$\Delta pV = nR\Delta T \quad \text{Cerrado}$$

$$\Delta H = \Delta U + \Delta pV$$

$$\Delta H = n\bar{C}_v\Delta T + nR\Delta T$$

$$\Delta H = n\left(\bar{C}_v + R\right)\Delta T$$

$$\Delta H = n\,\bar{C}_p\,\Delta T$$

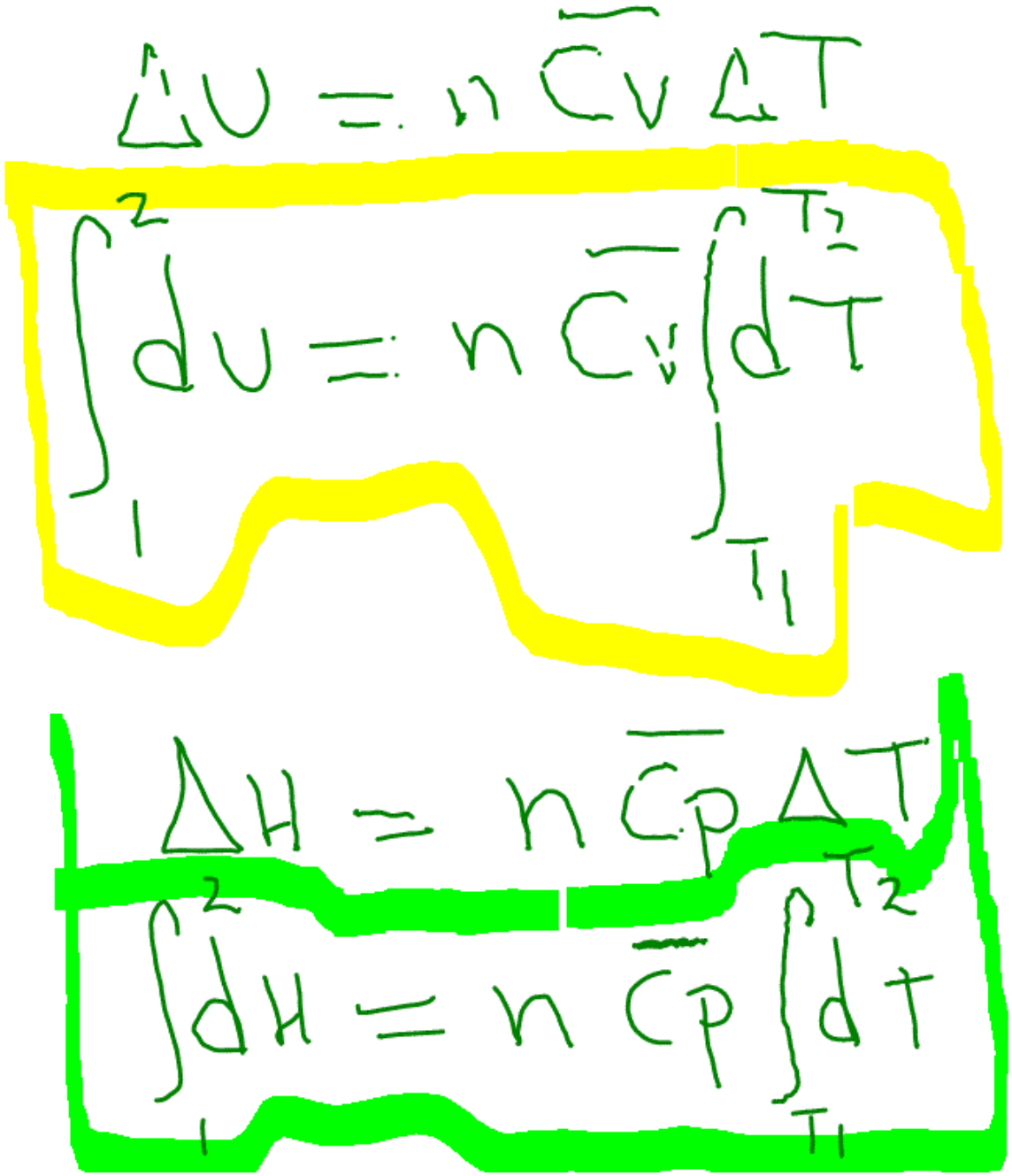
$$\Delta H = \Delta U + \Delta pV$$

$$= \Delta U + (p_2 V_2 - p_i V_1)$$

$$= \Delta U + [p_2 - p_1 (V)]$$

$$p_2 = p_1$$

$$\boxed{\Delta H = \Delta U}$$


$\Delta U = n \bar{C}_V \Delta T$
$\int_1^2 dU = n \bar{C}_V \int_{T_1}^{T_2} dT$
$\Delta H = n \bar{C}_p \Delta T$
$\int_1^2 dH = n \bar{C}_p \int_{T_1}^{T_2} dT$

Funciones de trayectoria

- q microscópica
- W macroscópica

Proceso

$H_1 \longrightarrow H_2$

$H_2 - H_1 = \Delta H$

$W_2 - W_1 = \Delta W$ X

↓ [Rev. Multipasos
[Irrev. 1 solo paso

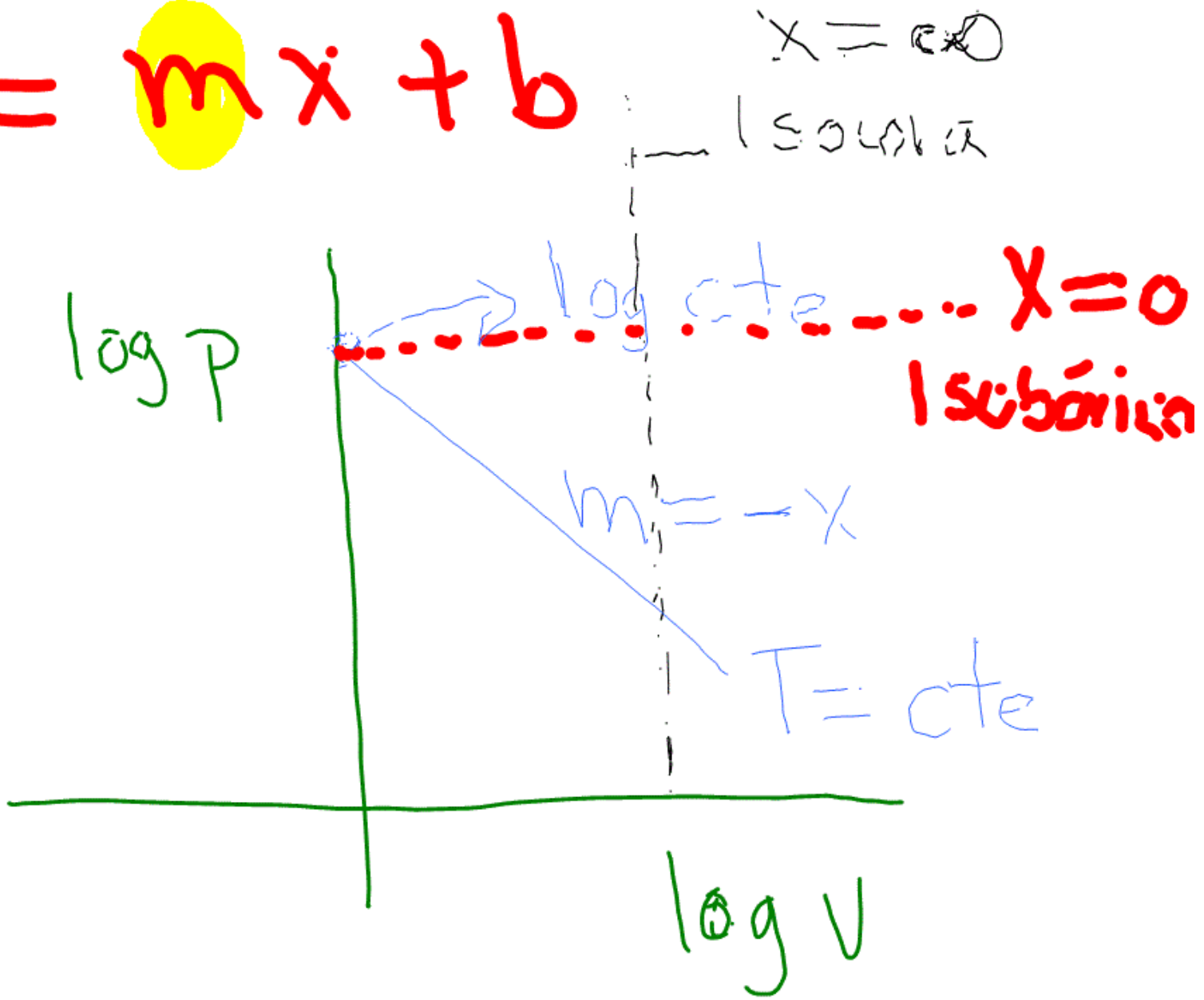
$$pV = nRT$$

$$\left(pV^{x} = cte\right) \log$$

$$\log p + x \ln V = \log cte$$

$$\boxed{\log p = \log cte - x \ln V}$$

$y = mx + b$



$$pV^{x} = cte$$

$$x = 1$$

$$pV^{1} = cte$$

isotérmico

$X = 0$

$pV^0 = cte$

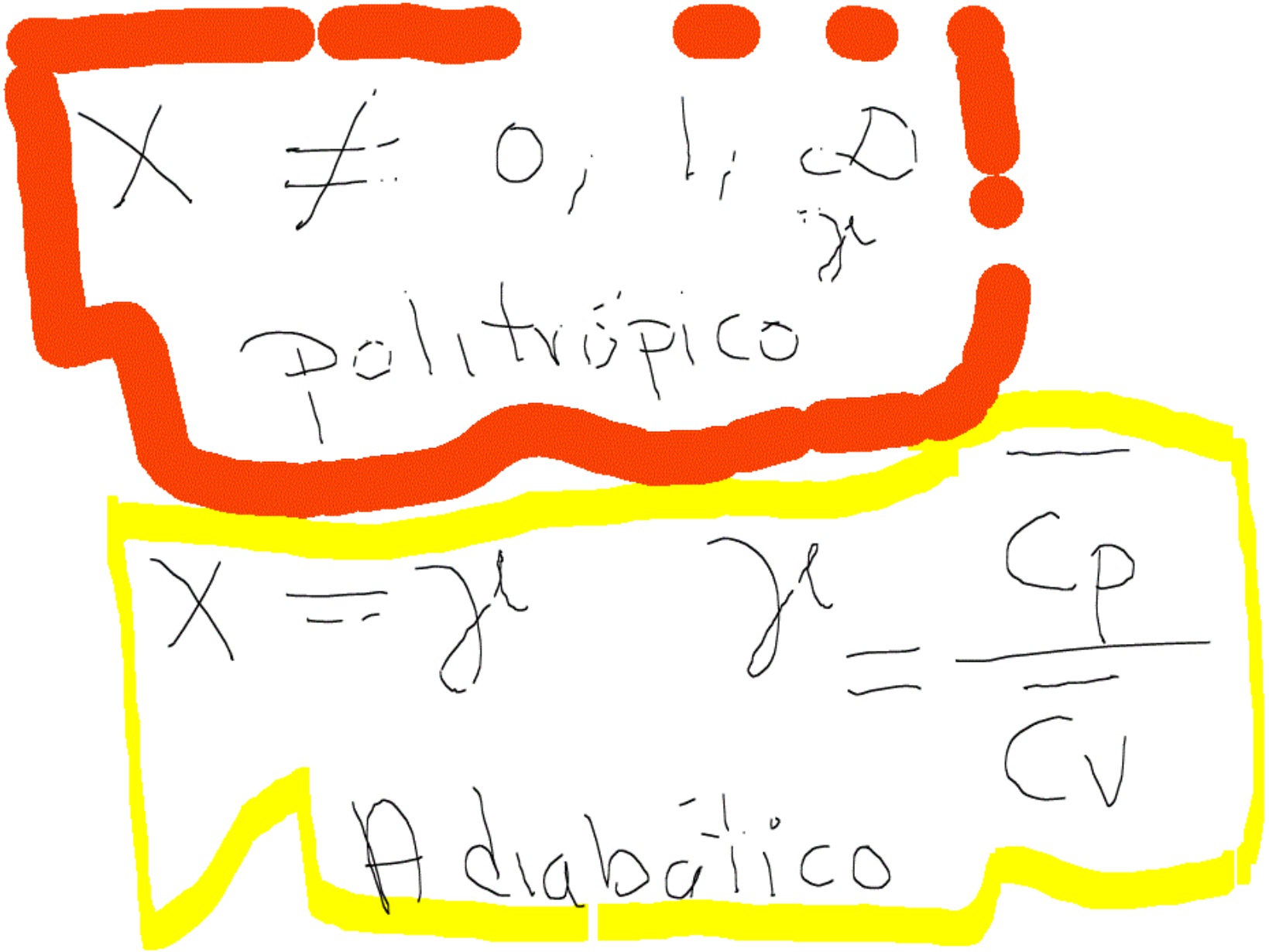
$p = cte$

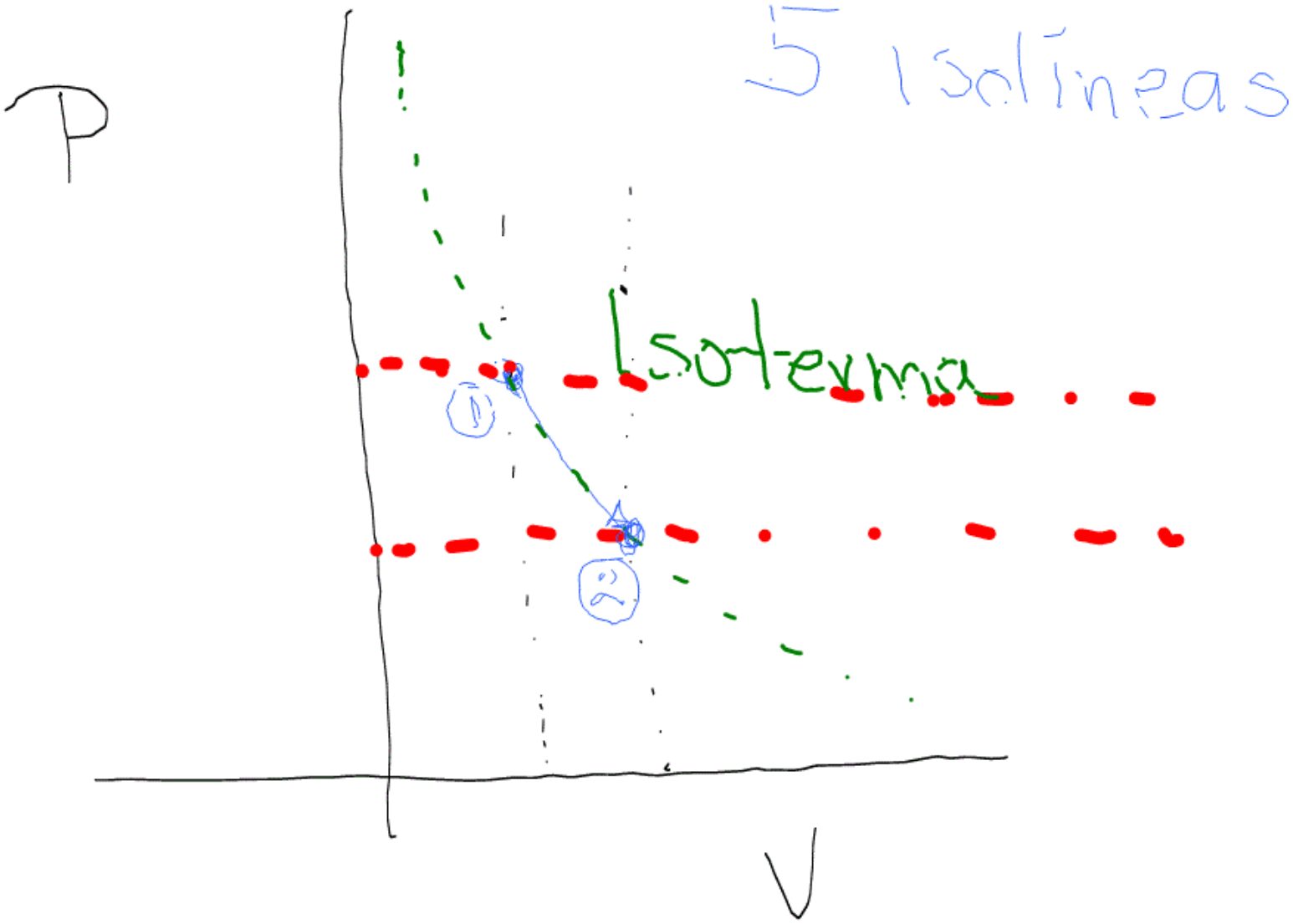
Isobárico

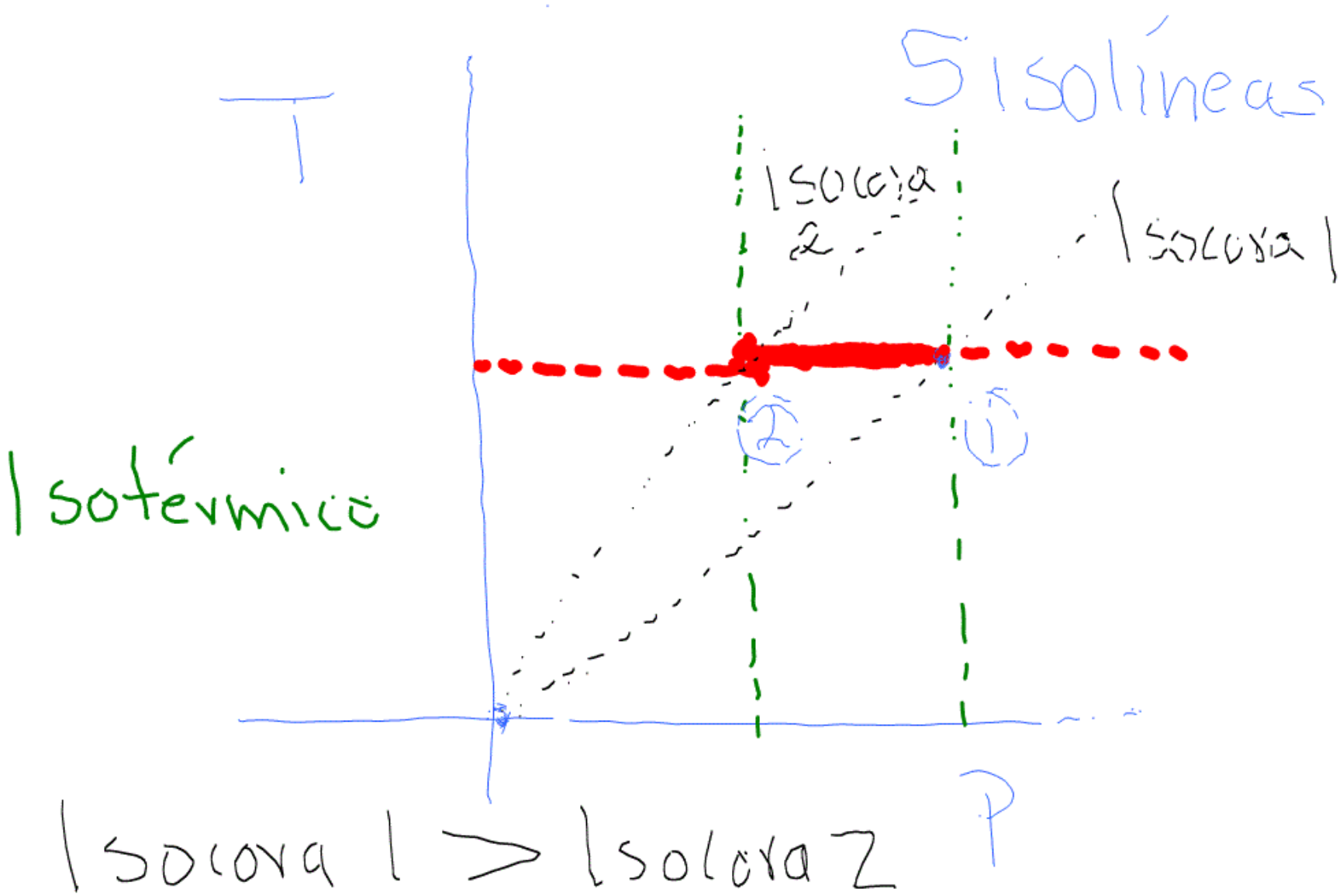
$$pV^{\gamma} = cte$$

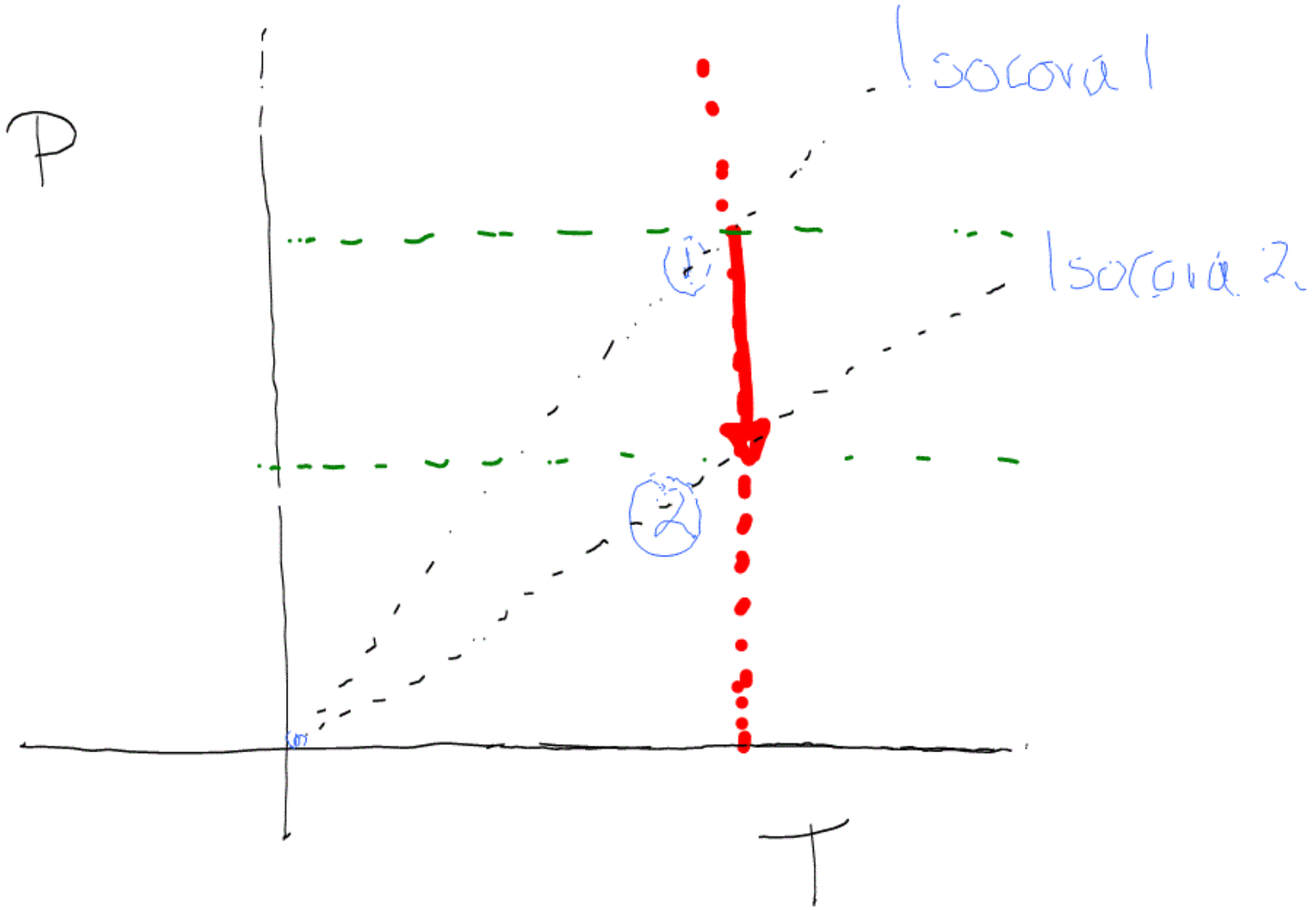
$$\gamma = \infty$$

Isocórico


X ≠ 0, 1, ∞
γ
politrópico
X = γ
γ = Cp / Cv
adiabático


5 isolíneas
P
Isoterma
1
2
V


T
Isolíneas
Isocora 2
Isocora 1
Isotérmica
2
1
P
Isocora 1 > Isocora 2


P
Isocora 1
Isocora 2
1
2
T