explorar

refinar o
intensificar la
busqueda

f

# Enfriamiento Simulado:

Estado inicial $x_0 \rightarrow$ current

For $i = 0, 1, 2, \ldots$

    $T = T(i)$    itinerario

    next = Operador de búsqueda local (current)

    $\Delta E = f(\text{next}) - f(\text{current})$

    If $\Delta E < 0$:     ($f$ mejora)

        current $\leftarrow$ next (mejor)

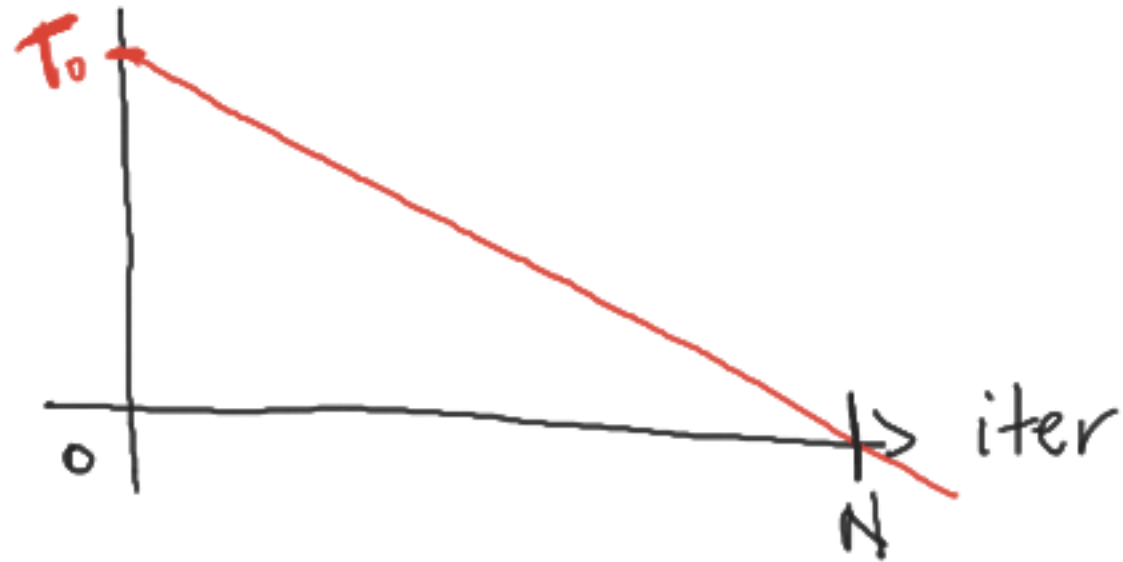    Else:

        If (random $[0,1] < P = e^{-\Delta E / k_T}$):

            current $\leftarrow$ next (peor)
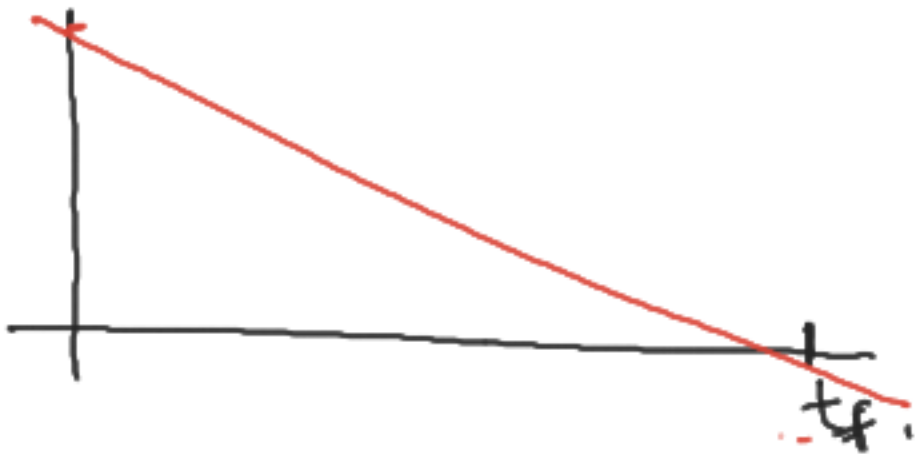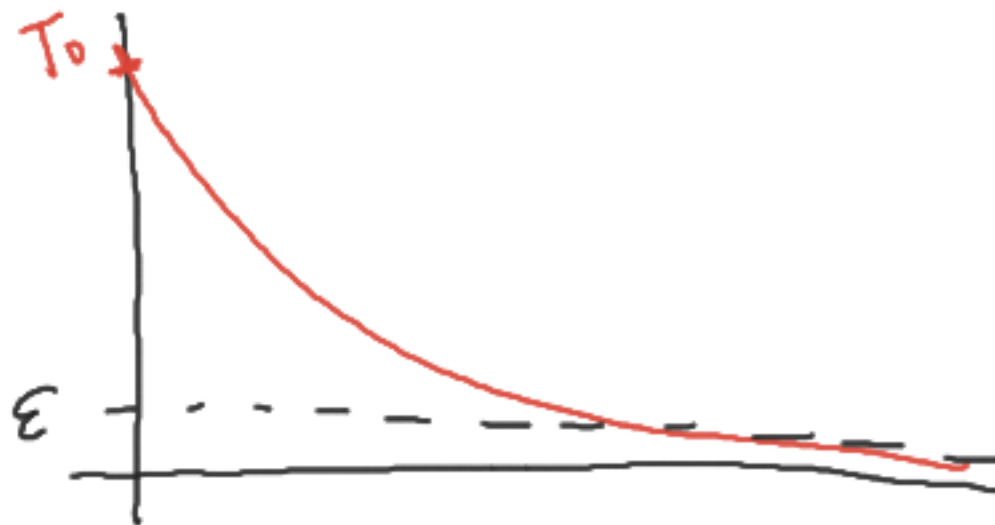
# Itinerario de T:



$$T(i) = T(i-1) - \alpha, \qquad \alpha > 0$$

$N$ #iteraciones $\qquad \alpha = \dfrac{T_0}{N}$
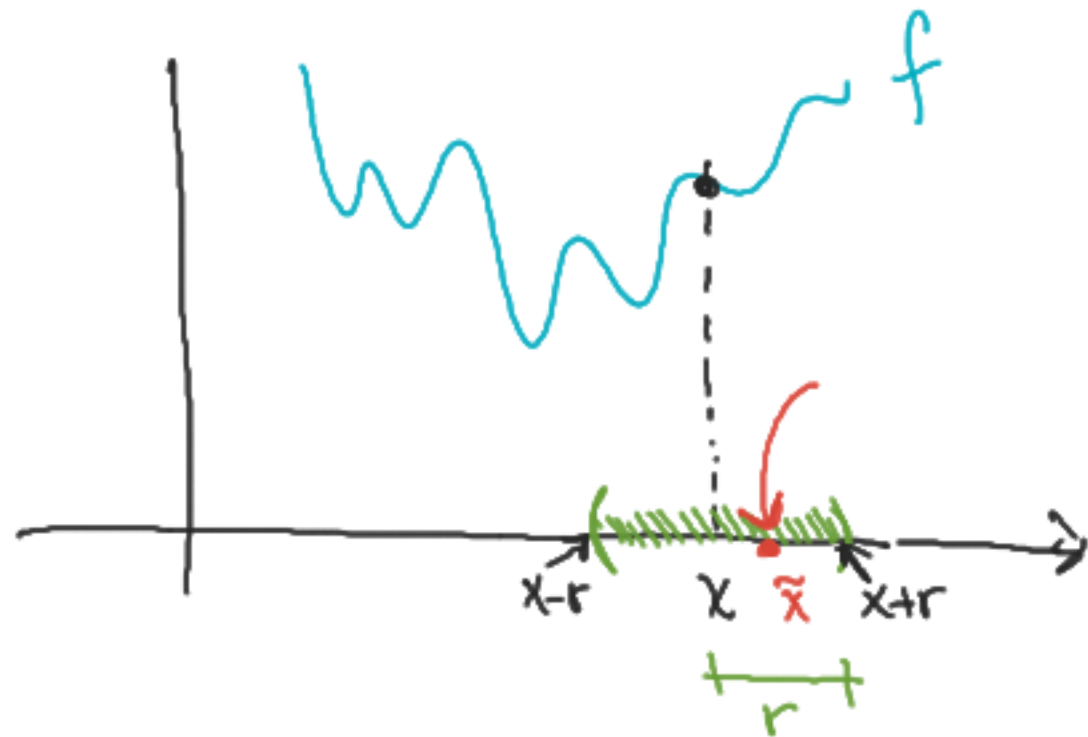
$$T(i) = T_0 - \dfrac{i}{N} T_0$$

$$P = e^{-\Delta E / k T(i)}$$

$$T(i) = \alpha T(i-1) \qquad 0 < \alpha < 1$$

# Operador de Búsqueda Local:

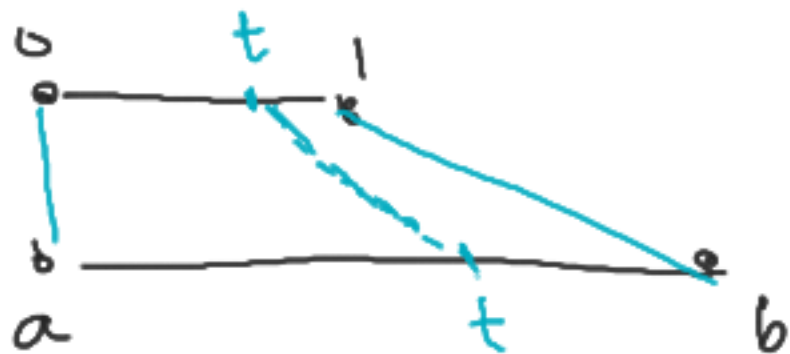Ej:   $f: \mathbb{R} \longrightarrow \mathbb{R}$



$x-r \quad x \quad \tilde{x} \quad x+r$

$r$

```
def OpBúsqueda (x, r):
    t = random (0,1)
    y = (x-r) + t[(x+r)-(x-r)]
    return y
```
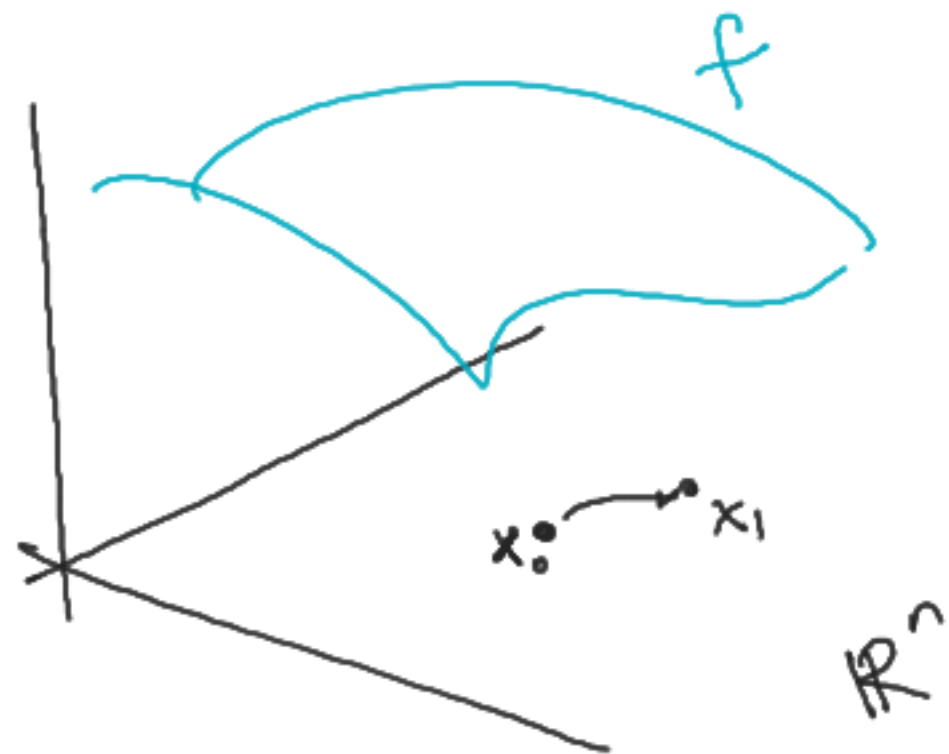
$x = $ current

$\tilde{x} = $ next



$y = a + t(b-a)$

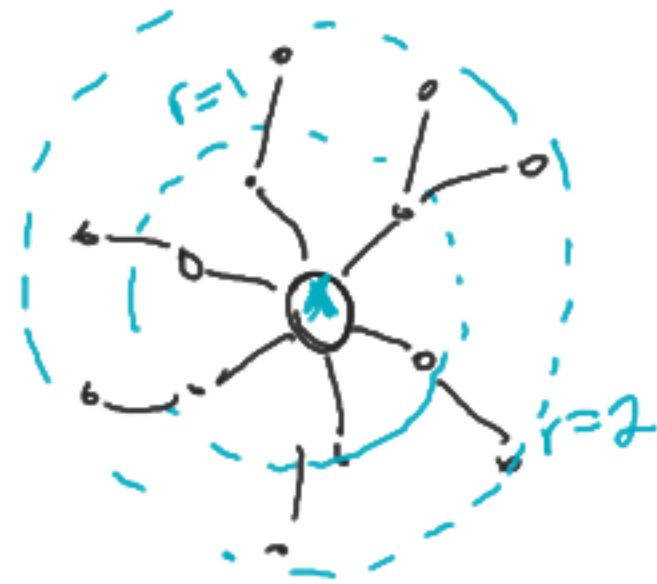$$f: \mathbb{R}^n \longrightarrow \mathbb{R}$$
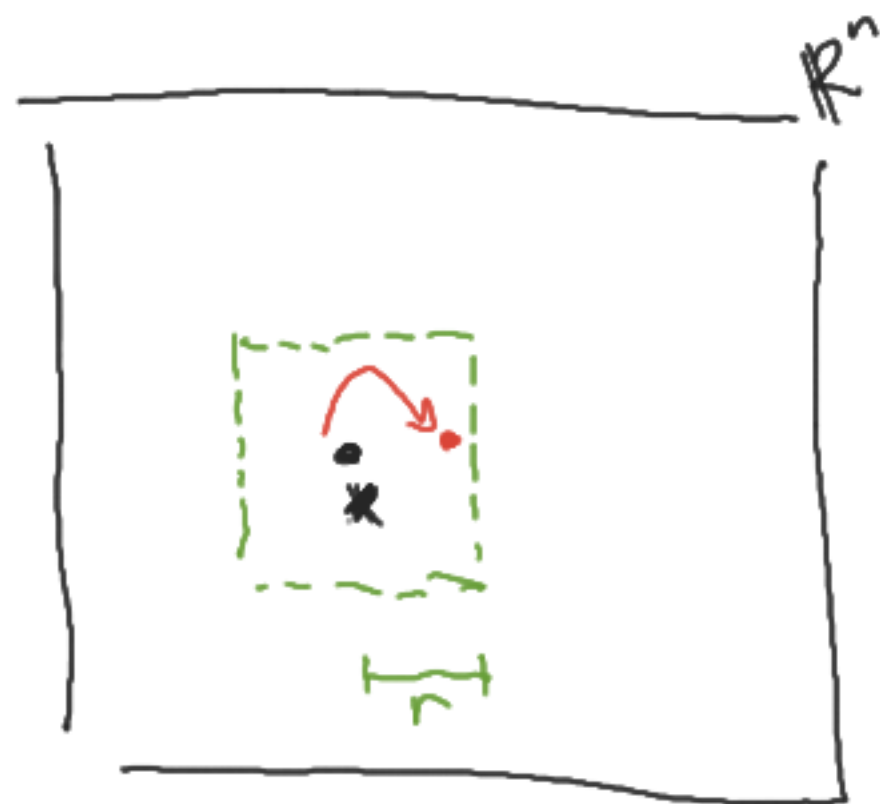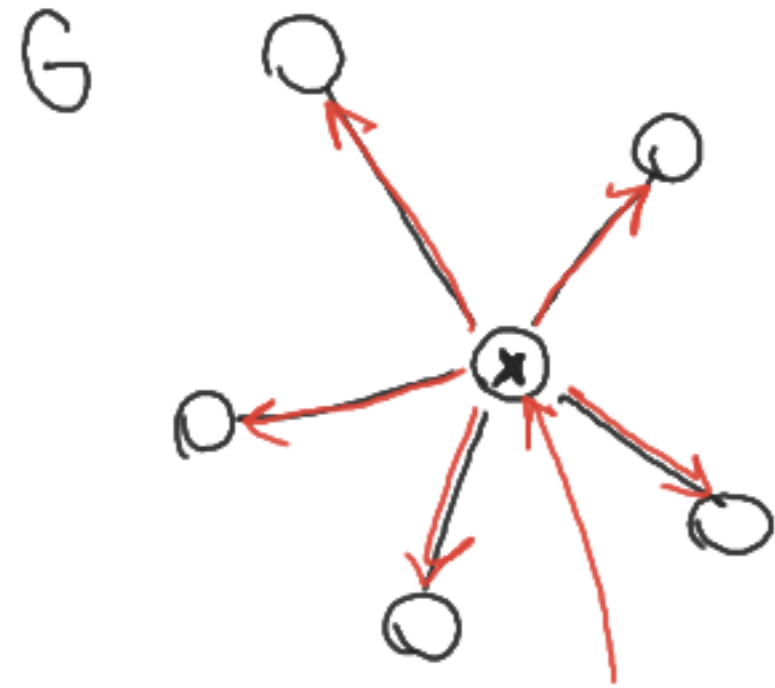


$x = (x_1, x_2, \ldots, x_n)$

for $i=1$ to $n$:

$\qquad t_i = random(0,1)$

$\qquad y_i = x_i - r + t_i(x_i + r - (x_i - r))$

return $(y_1, y_2, \ldots, y_n)$

G



$x = $ current

```
def OpBúsqueda (x, G):
    N = vecinos de (x)
    elegir y ∈ N aleatoriamente
    return y
```

$T =$

| 4 | 5 | |
|---|---|---|
| 2 | 3 | 8 |
| 1 | 6 | 7 |

⤳

| 4 | 5 | 0 | 2 | 3 | 8 | 1 | 6 | 7 |

| 1 | 2 | 3 |
|---|---|---|
| 4 | 5 | 6 |
| 7 | 8 | |

⤳

| 1 2 3 4 5 6 7 8 0 | obj.

| 4 | 1 | 3 |
|---|---|---|
| 7 | 5 | 2 |
| 8 | | 6 |

↑

| 4 | 1 | 3 |
|---|---|---|
| 7 | | 2 |
| 8 | 5 | 6 |

↓

| 4 | | 3 |
|---|---|---|
| 7 | 1 | 2 |
| 8 | 5 | 6 |

G