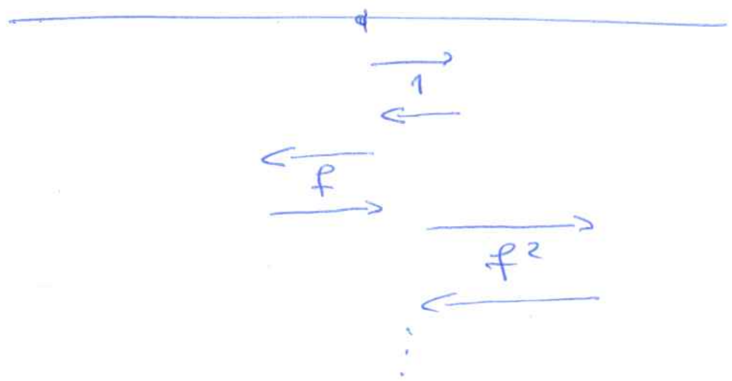
EDISON

Total distance travelled : x



$$x = 1 + 1 + f + f + f^2 + f^2 + \dots + 2f^n$$

$$x = 2\left(1 + f + f^2 + \dots + f^n\right)$$

$$x = 2\sum_{k=0}^{n} f^k$$

Assume the object that we are looking for is at a distance : d :

So, we would have travelled a distance

$$x = 2\sum_{k=0}^{n} f^k + d$$ when we found

Then, the regret

$$R = \frac{2\sum_{k=0}^{n} f^k}{d} + 1$$

$$R \propto \frac{2\sum_{k=0}^{n} f^k}{d}$$

where

d is a constant, (the distance at which the object is)

So, the minimum value of the Regret corresponds to the minimum value of

$$\sum_{k=0}^{n} f^k \qquad \text{when } f > 0$$

if $f = 0$, we don't move

let $f > g \qquad g > 0$

$$\sum_{k=0}^{n} f^k - \sum_{k=0}^{n} g^k$$

$$= \sum_{k=0}^{n} \left(f^k - g^k\right) \qquad f^k - g^k < 0 \text{ since } f > g$$

$$\sum_{k=0}^{n} \left(f^k - g^k\right) < 0$$

The function $h(f) = \sum_{k=0}^{n} f^k \qquad f > 0$

is monotone increasing.

Domain of $h(f)$: $f > 0$

~~wh~~ which is ubounded

~~Here~~, if I am connect until here, ~~and~~ I will still be inclined to maintain that f has to be discrete.

Because

we are looking for the minimum of the function

$h(f) = 1 + f + f^2 + \dots f^n$

~~to~~ for $f > 0$

$h(f)$ is ~~a~~ strictly monotone increasing.

However, in ~~an~~ ~~un~~ an ~~non strictly bounde~~ unbounded domain, a monotone function doesn't have a minimum, nor a maximum

Therefore f has to be discrete, not continuous because ~~of~~

~~a monotone function of~~

a monotone increasing function of discrete variable (bounded for below) has a unique minimum.

So, ~~for~~ $\cancel{h(f) = \sum_{k=0}^{n} f^{k}}$

~~If f is discrete, then the minimum is optimum value of f is f = 2.~~

So, for $h(f)$ to have a minimum, f must be from a set of discrete values (not from $\mathbb{R}$ which is continuous). If f comes from $\mathbb{N}$ (set of integers), the optimum value is $f = 2$