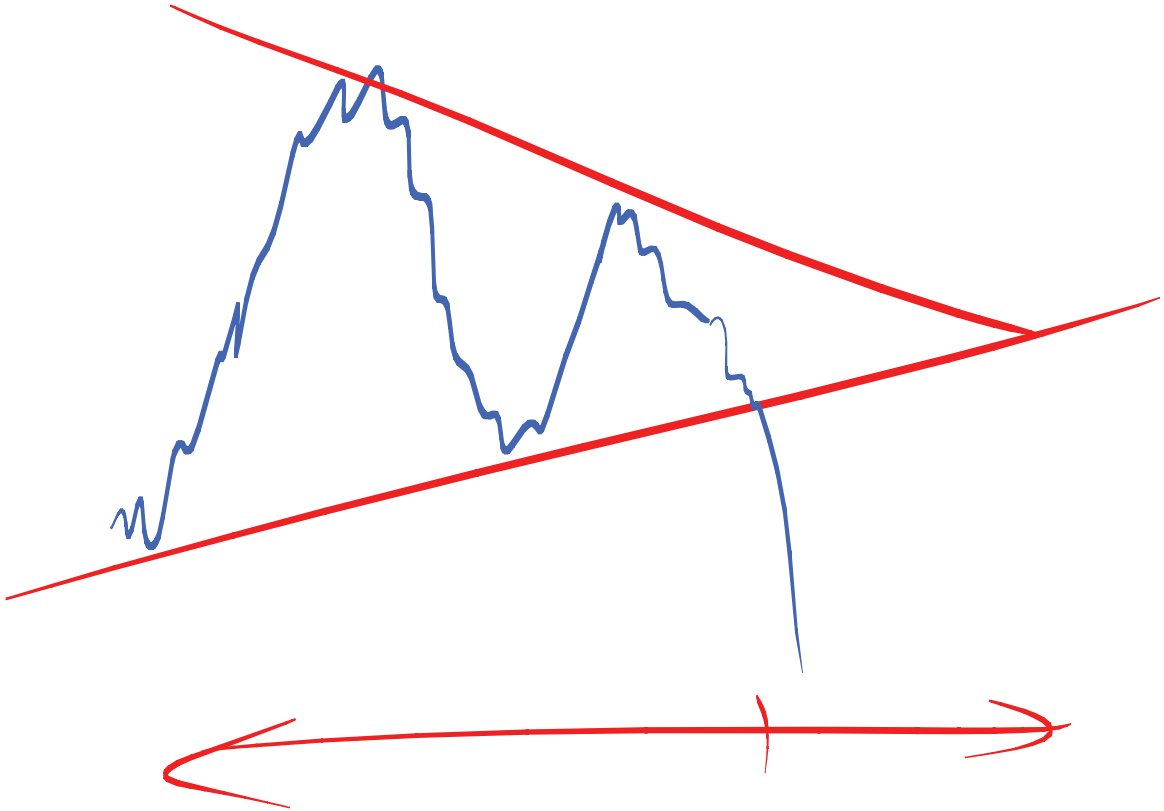
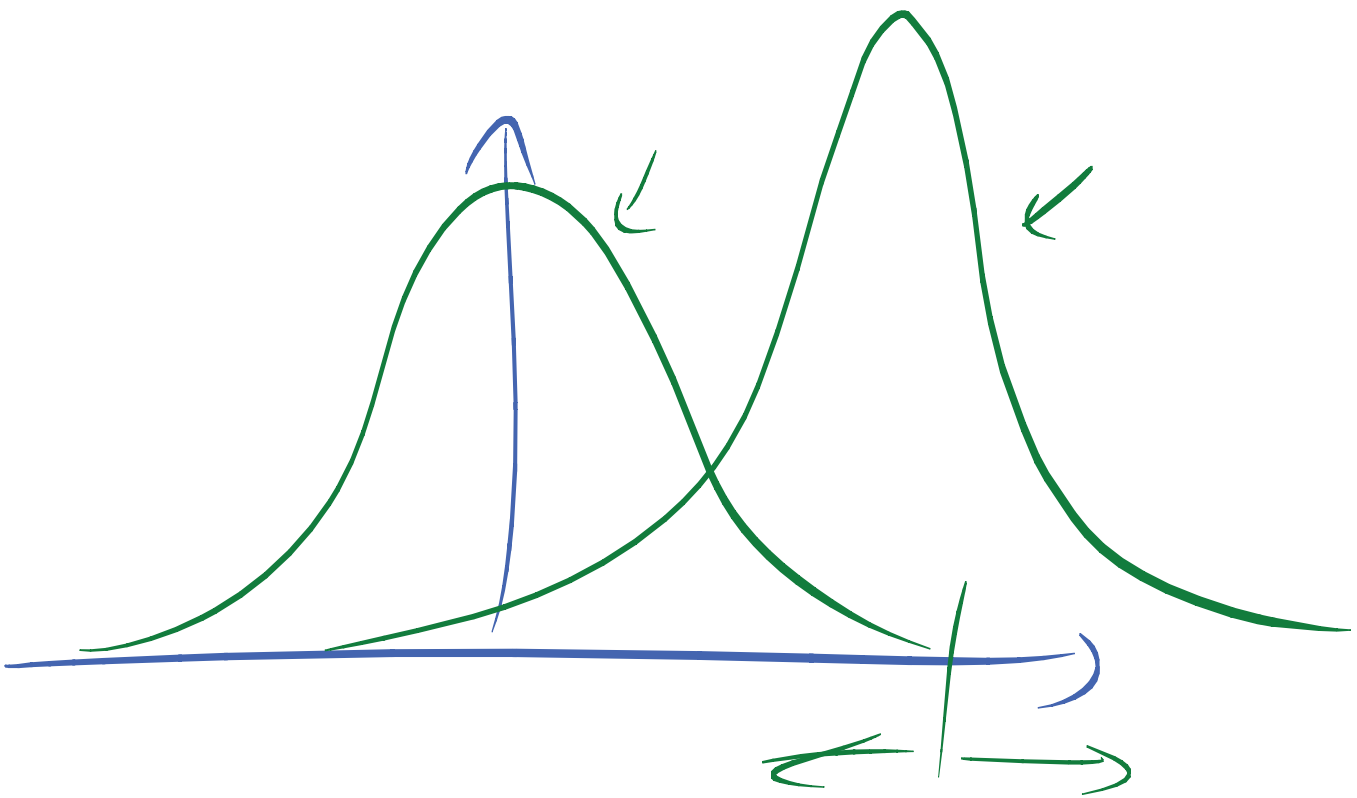
c.riseley@7city.com

"Extras"

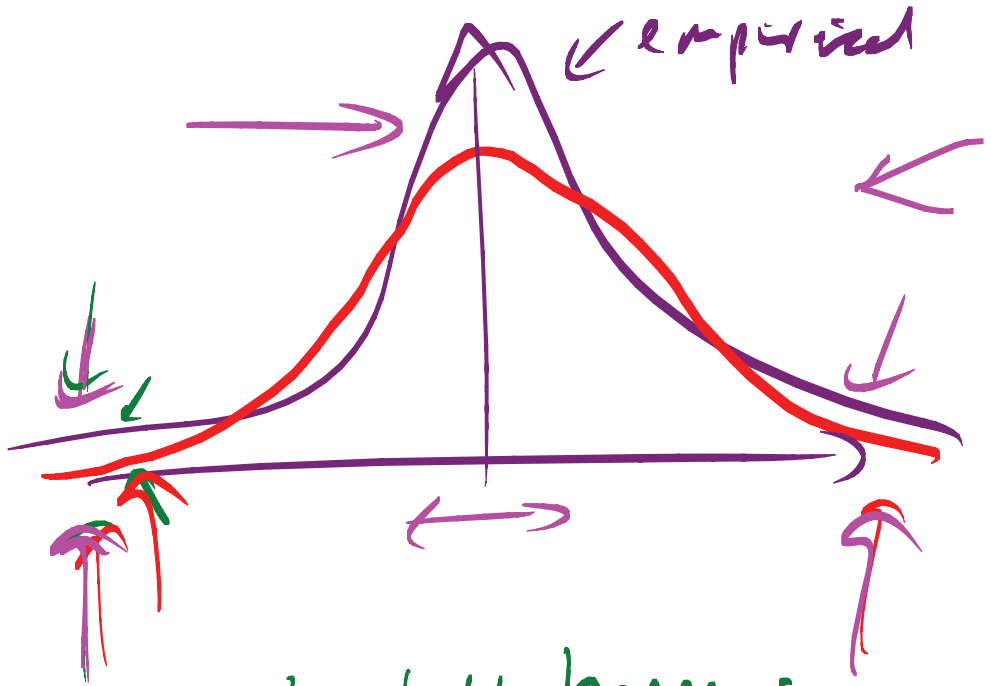




19th Oct 1987

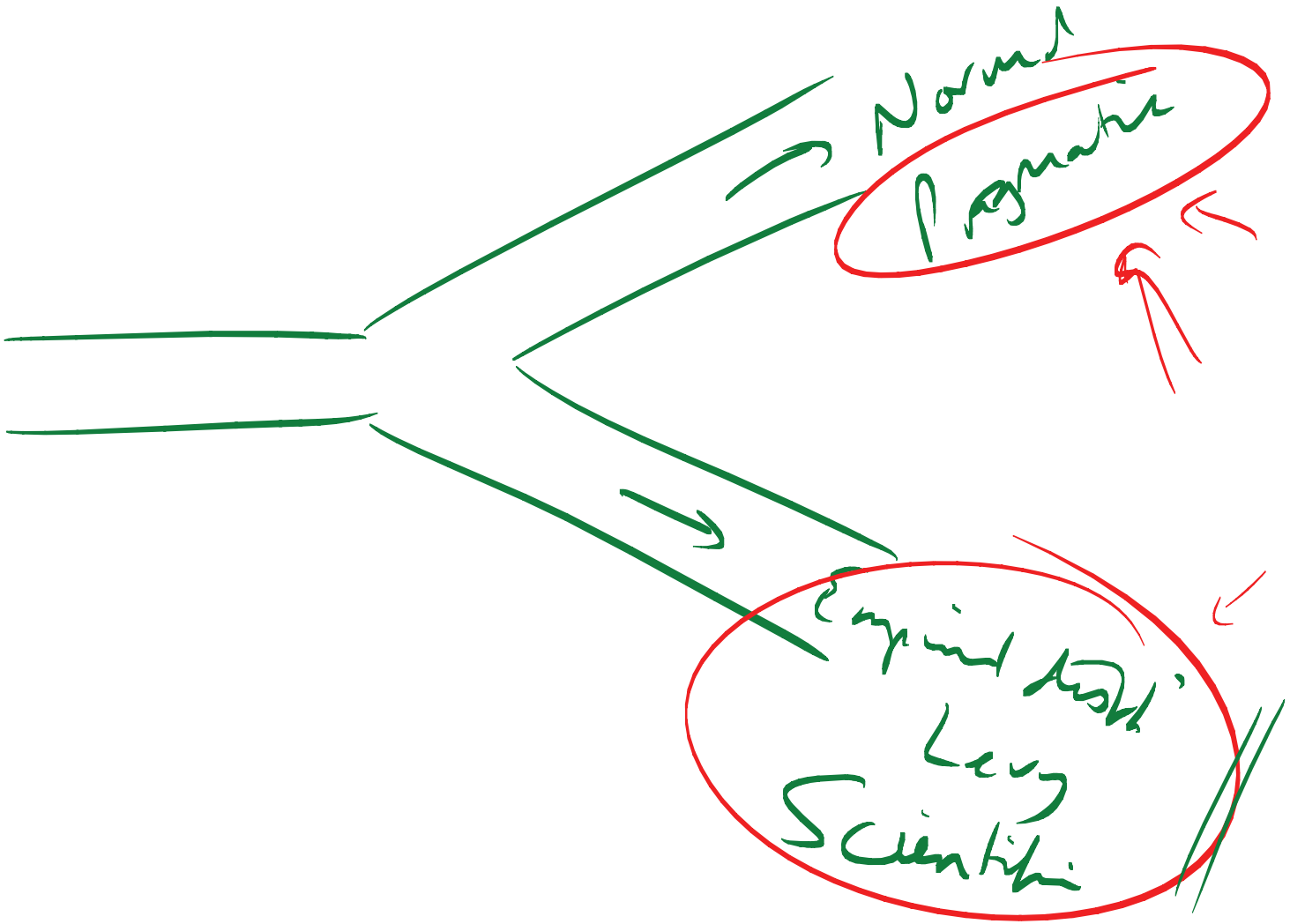
-20%

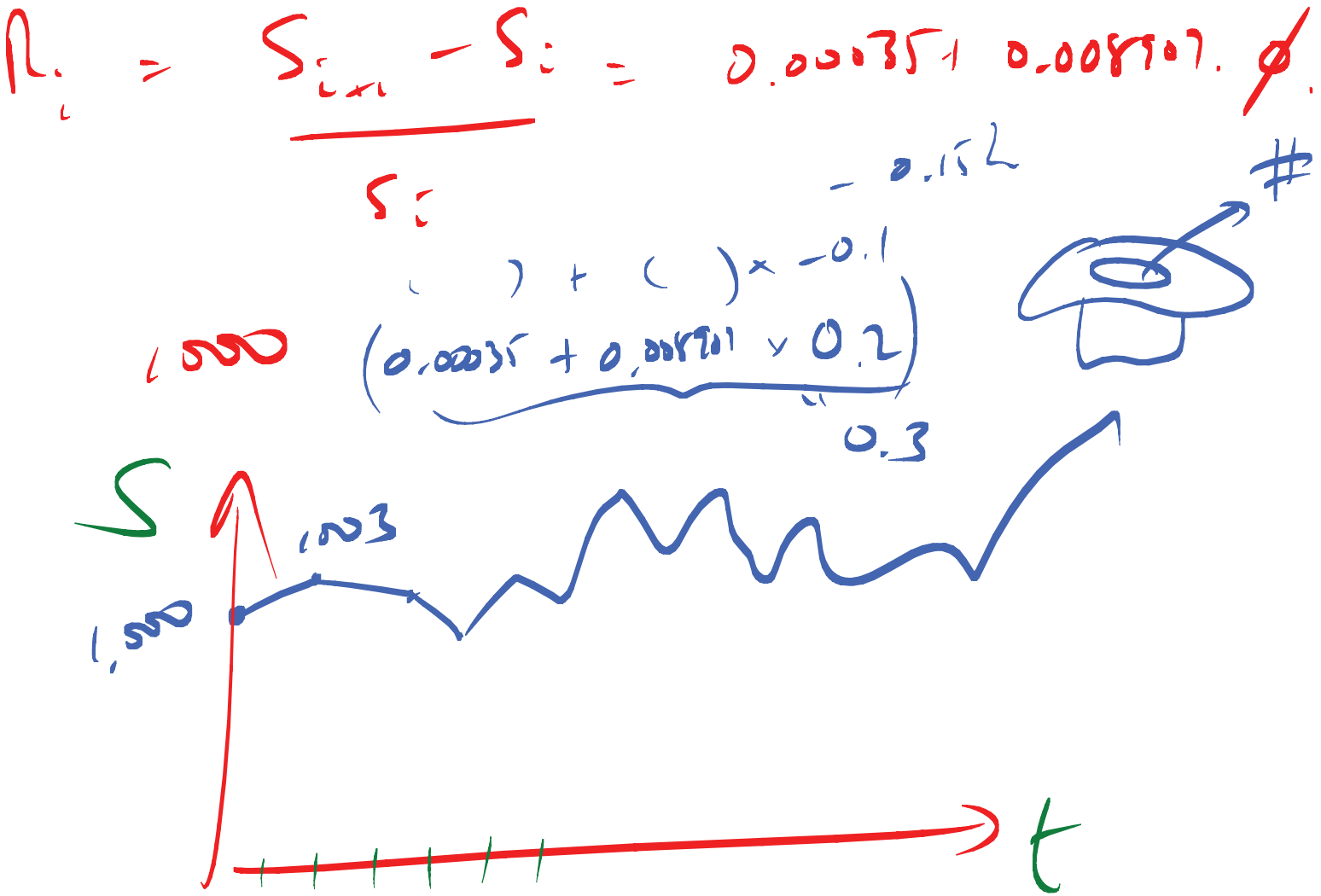
L.U. = 14×10^9 yrs



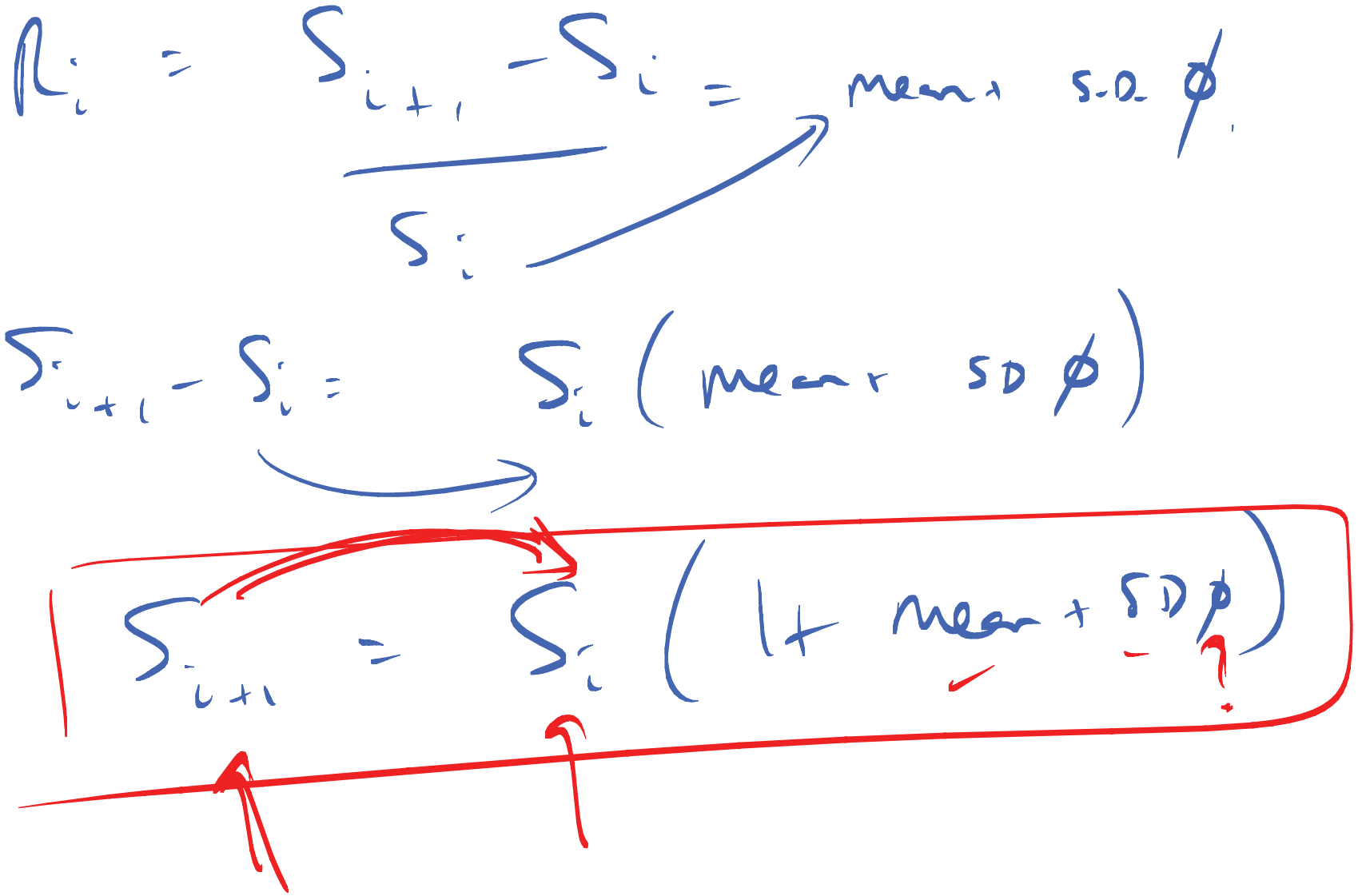
Empirical Data: A one-day 20% fall happens once every 60 years

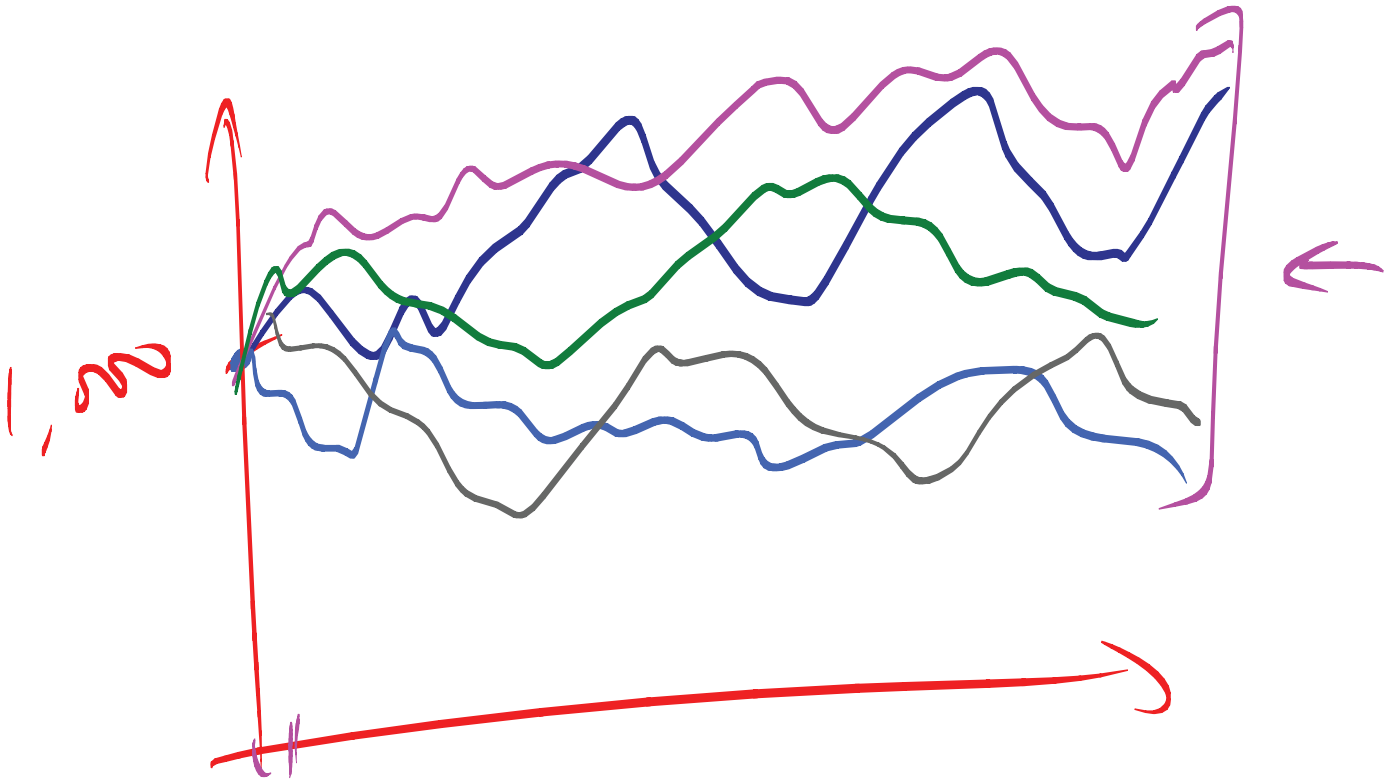
Normal Distbn: A one-day 20% . . . . . 10^{100} years

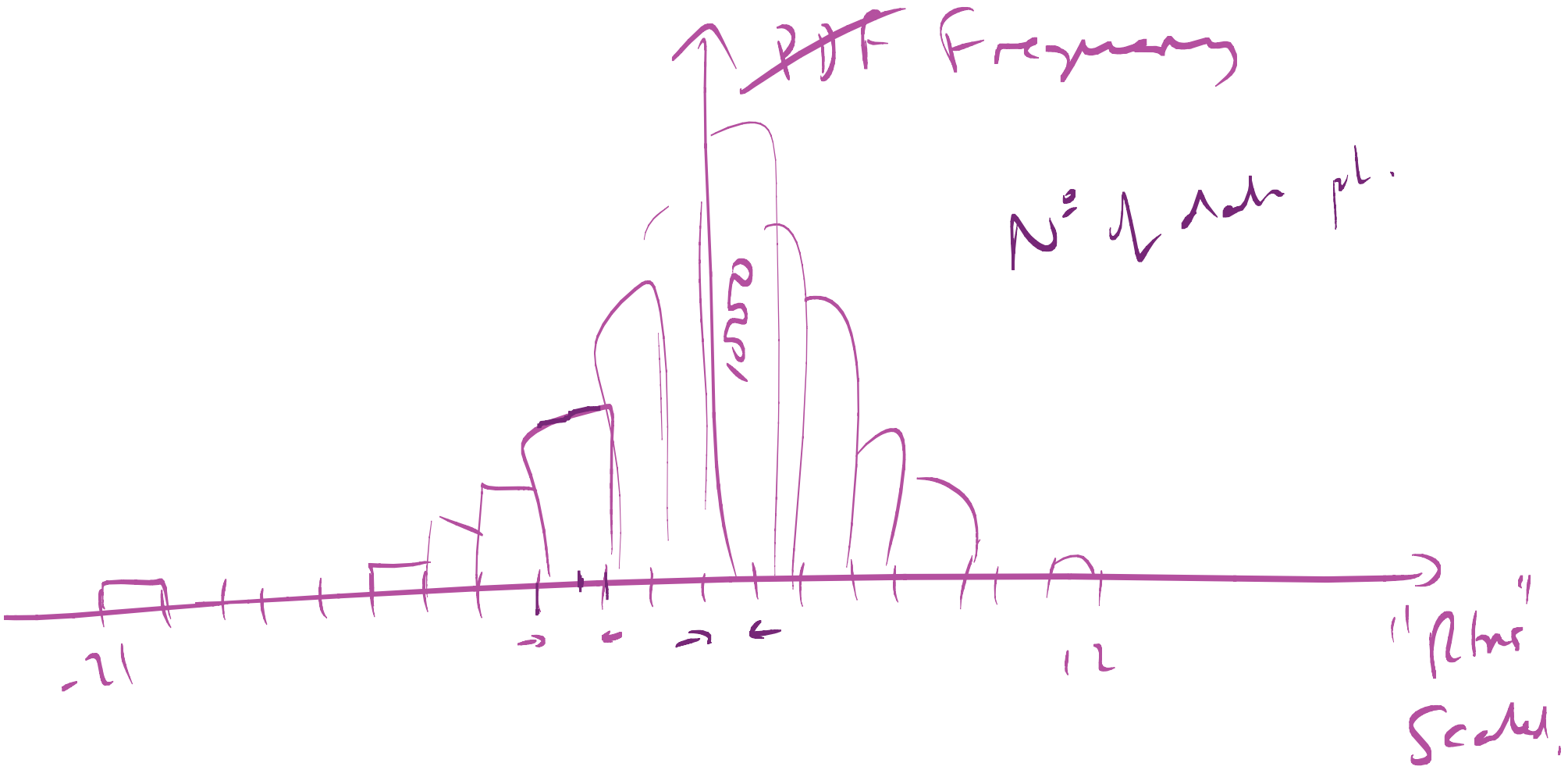

Normal
Pragmatic
Empirical
Law
Scientific

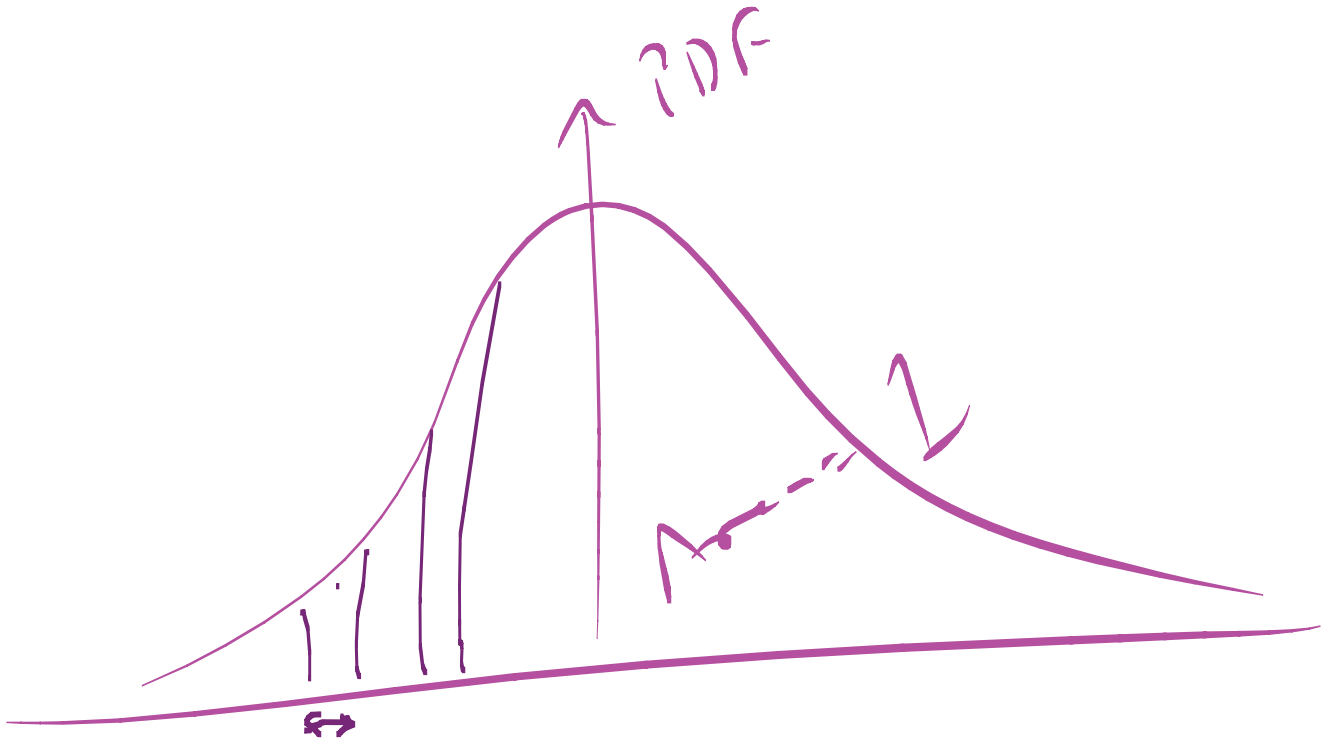

S
1,003
1,000
0.3
t

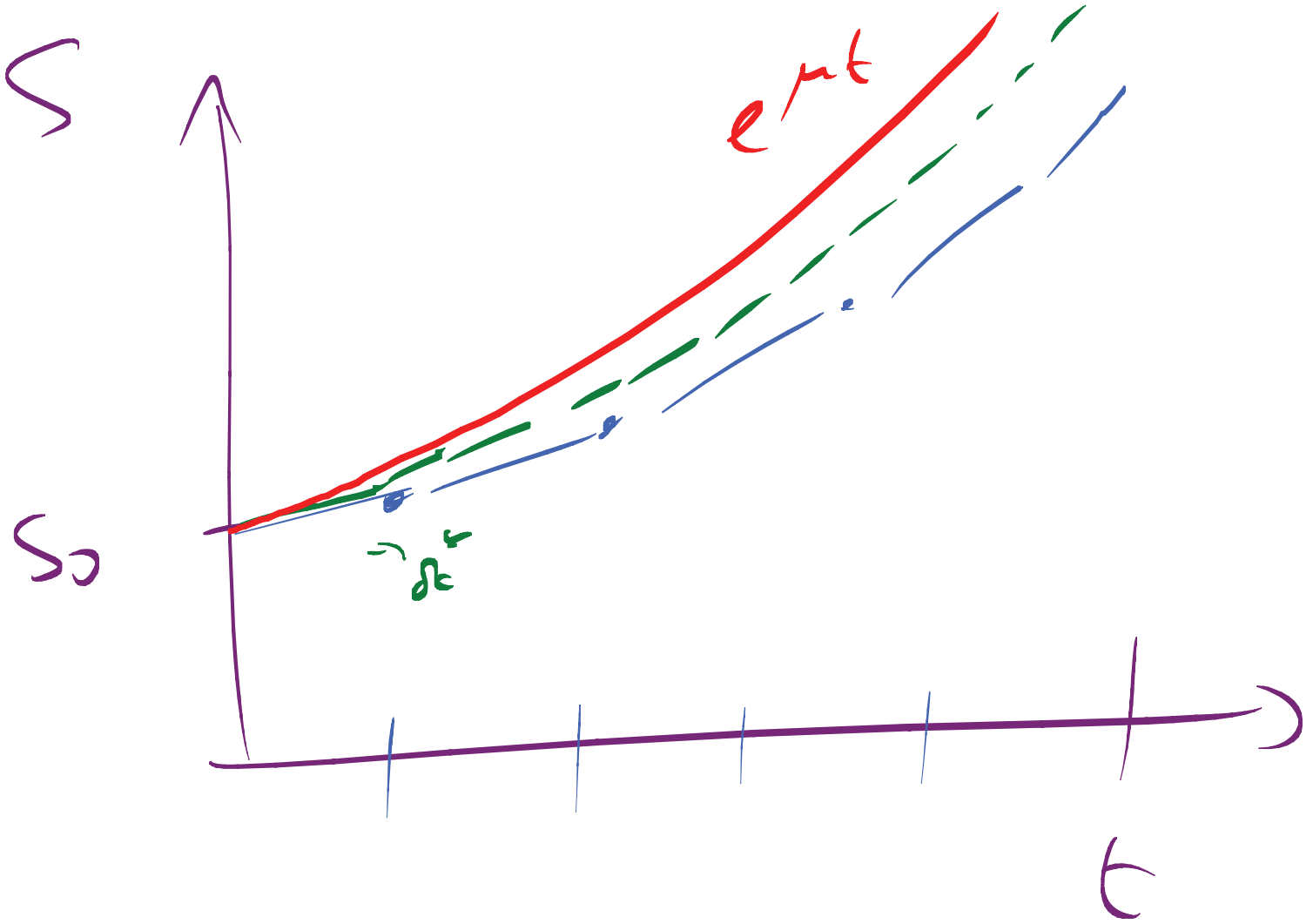
Serial Autocorrelation


$r_i = \frac{S_{i+1} - S_i}{S_i} =$ mean S.D. ϕ
$S_{i+1} - S_i = S_i$ (mean SD ϕ)
$S_{i+1} = S_i$ (1 + mean + SD ϕ)




~~PDF~~ Frequency
No of data pt.
1000
-21
12
"Rtns"
Scaled.




S
$e^{\mu t}$
S_0
δt
t

$$\text{mean} = \mu \cdot \Delta t^{\alpha}$$

$$S_1 = S_0 \left(1 + \mu \cdot \Delta t^{\alpha} \right)$$

$$S_2 = S_0 \left(1 + \mu \Delta t^{\alpha} \right)^2$$

$$S_M = S_0 \left(1 + \mu \Delta t^{\alpha} \right)^M \quad \|$$

$$\Delta t \, M = t \qquad S_0 \exp\left(M \ln\left(1 + \mu \Delta t^{\alpha} \right) \right)$$

$$M = t / \Delta t$$

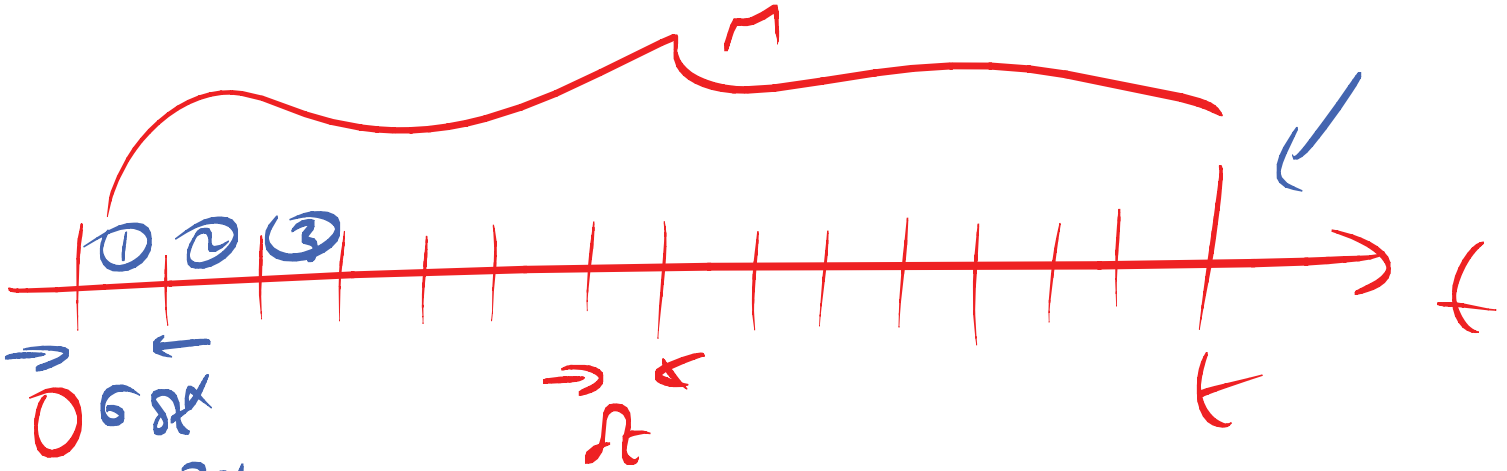
$$\simeq S_0 \exp\left(M \cdot \mu \, \delta t^{\alpha} \right)$$

$$= S_0 \exp\left(\frac{t}{\delta t} \mu \cdot \delta t^{\alpha} \right)$$

$$= \boxed{S_0 \exp\left(\mu t \cdot \delta t^{\alpha - 1} \right)}$$

1) $\alpha > 1$ $S(t) = S_0$. Yawn! 3) $\alpha = 1$. $S(t) = S_0 e^{\mu t}$!

2) $\alpha < 1$ $S(t) = \infty$.



S.D $\sigma \delta x^{\alpha}$

Var. $\sigma^2 \delta x^{2\alpha}$

$M = t/\delta t$

$$S.D. = \sigma \, \delta t^{\alpha}$$

$$\sigma^2 \delta t^{2\alpha} + \sigma^2 \delta t^{2\alpha} + \sigma^2 \delta t^{2\alpha} + \cdots + \sigma^2 \delta t^{2\alpha}$$

$$= \sigma^2 \cdot \frac{t}{\delta t} \cdot \delta t^{2\alpha} \leftarrow \sigma^2 t \, \delta t^{2\alpha - 1}$$

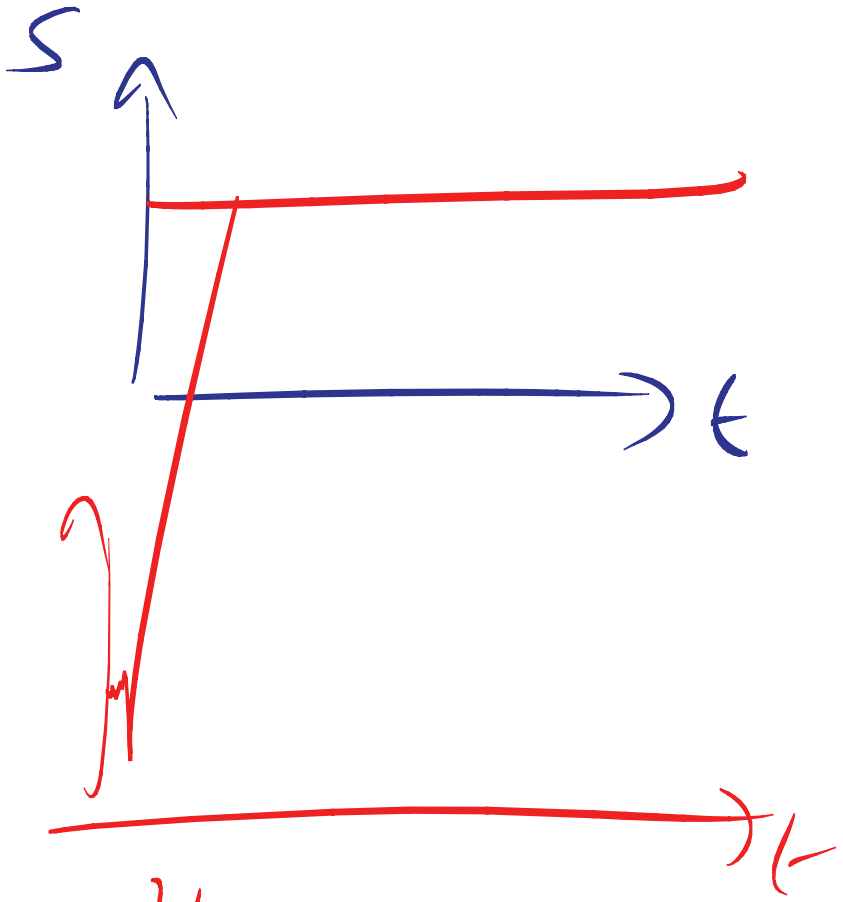
$\sigma^2 t \quad \delta t^{2\alpha-1}$

1) $\alpha > 1/2$.

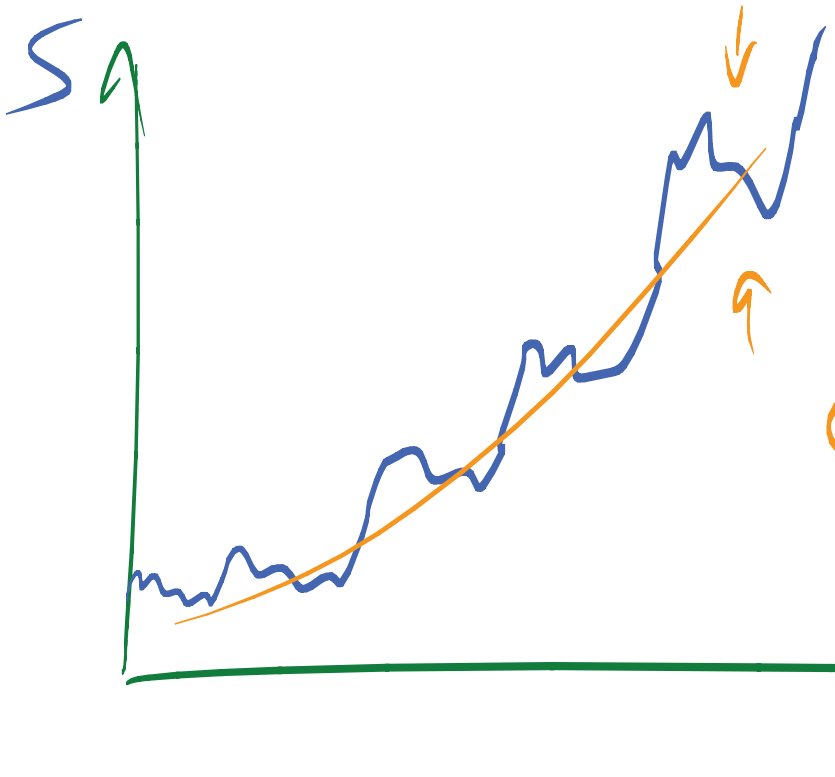
$var \to 0$

2) $\alpha < 1/2$

$var \to \infty$



3) $\alpha = 1/2$. $var \to \sigma^2 t$



$$\text{mean} = \mu \cdot \delta t$$

$$\text{S.D.} = \sigma \cdot \sqrt{\delta t}$$

$$\lim \; \delta t \to 0$$

$$\rightarrow dS = \mu S\, dt + \sigma S\, dX$$

stochastic differential equation

SDE

$$\frac{dS}{S} = \mu\, dt + \sigma\, dX$$

no S!

↑

Return