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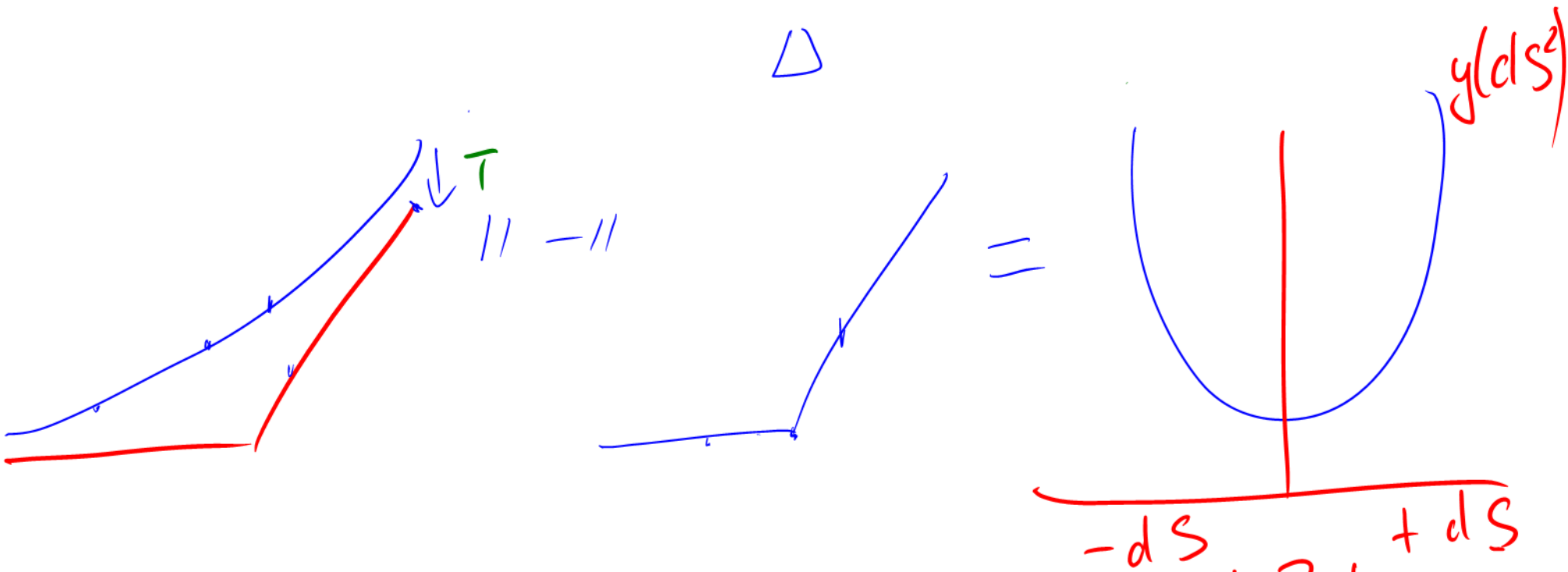


$$\frac{1}{2}\Gamma S^2\sigma^2 dt + \Theta(dt) = r\Pi dt$$

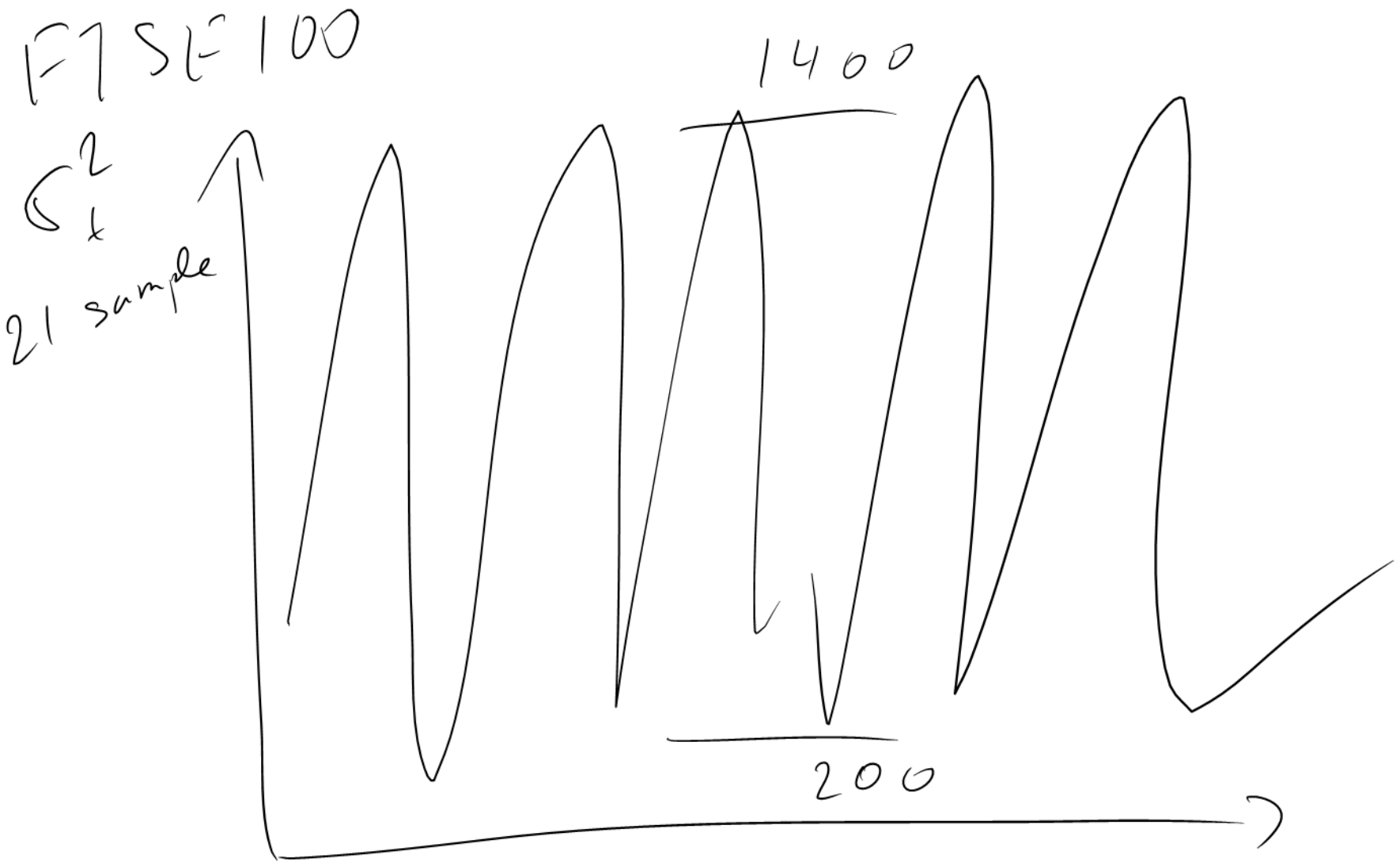
$\frac{1}{2}\Gamma S^2\sigma^2 dt$ ↗ gains

$\Theta(dt)$ ↑ negative

$\frac{1}{2}\Gamma(dS)^2$

$\frac{1}{2}\Gamma S^2\sigma^2 dt$

$$\Pi = \underbrace{V - \Delta S}$$



Heteroskedasticity

↳ Need EMWA / GARCH filtering. σ_{t+1}^2

$\sigma_{mkt} = 20\%$ annualised

$$\sigma_{3M} = \sqrt{0.2^2/4} = 10\%$$

$$\sigma_{1D} = \sqrt{0.2^2/252} = 1.26\%$$

	PDE	B-S Formulae
σ_{const}	✓	✓
$\sigma(t)$	✓	$\sqrt{\frac{1}{T-t}\int_t^T \sigma(\tau)^2 d\tau}$
$\sigma(t,S)$	✓	Local Volatility