Tuesday, May 04, 2010
10:05 AM

$$dS_t = \kappa(\theta - \ln S_t)\, S_t\, dt + \sigma S_t\, dW_t$$

$$X_t = \ln S_t$$

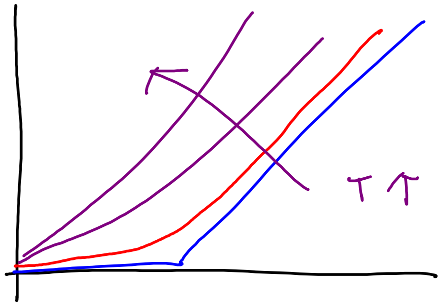
$$\Rightarrow dX_t = [\kappa(\theta - \underbrace{\ln S_t}_{X_t}) - \tfrac{1}{2}\sigma^2]\, dt + \sigma\, dW_t$$

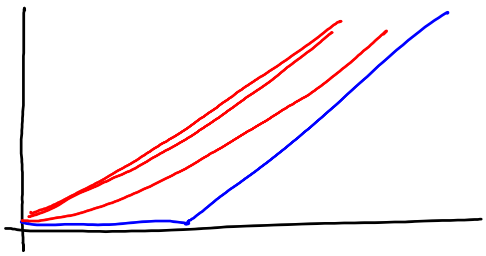
$$= \kappa\left(\left(\theta - \tfrac{1}{2}\tfrac{\sigma^2}{\kappa}\right) - X_t\right) dt + \sigma\, dW_t$$

$$\frac{dF_t(T)}{F_t(T)} = \sigma e^{-\bar{\kappa}(T-t)}\, d\bar{W}_t$$

$$= \sigma e^{-\bar{\kappa}(T-t)} [(\lambda_0 + \lambda_1 \ln S_t)\, dt + dW_t]$$

Tuesday, May 04, 2010
11:39 AM





Calendar spread..

$$V_t = \mathbb{E}_t^{\mathbb{Q}}\left[\left(F_T(T_1) - F_T(T_2) \right)_+ \right]$$

$$\eta_t = \left(\frac{d\mathbb{Q}^*}{d\mathbb{Q}} \right)_t = \frac{F_t(T_2)}{F_0(T_2)}$$

* η_t is $\mathbb{Q}$-mtg
* $\eta_0 = 1$
* $\eta_t > 0$ a.s.

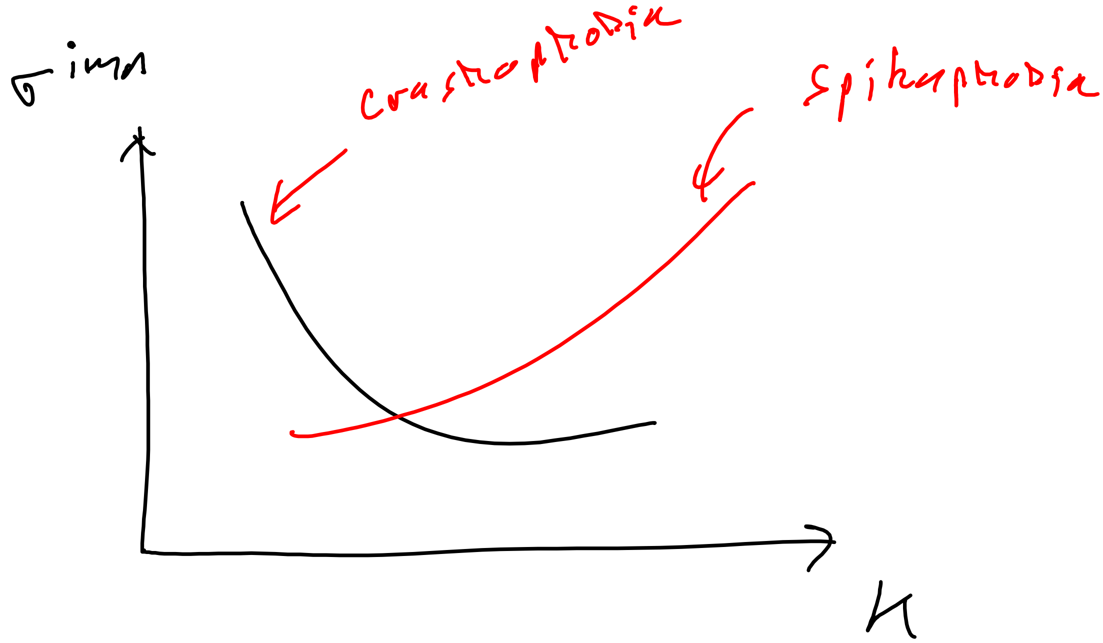
$$\frac{d\eta_t}{\eta_t} = \sigma e^{-\kappa(T-t)} d\widetilde{W}_t$$

$$V_t = \frac{\mathbb{E}_t^{\mathbb{Q}^*}\left[\left(F_T(T_1) - F_T(T_2) \right)_+ \cdot \frac{F_0(T_2)}{F_T(T_2)} \right]}{\frac{F_0(T_2)}{F_t(T_2)}}$$

$$= F_t(T_2)\, \mathbb{E}_t^{\mathbb{Q}^*}\left[\left(\frac{F_T(T_1)}{F_T(T_2)} - 1 \right)_+ \right]$$

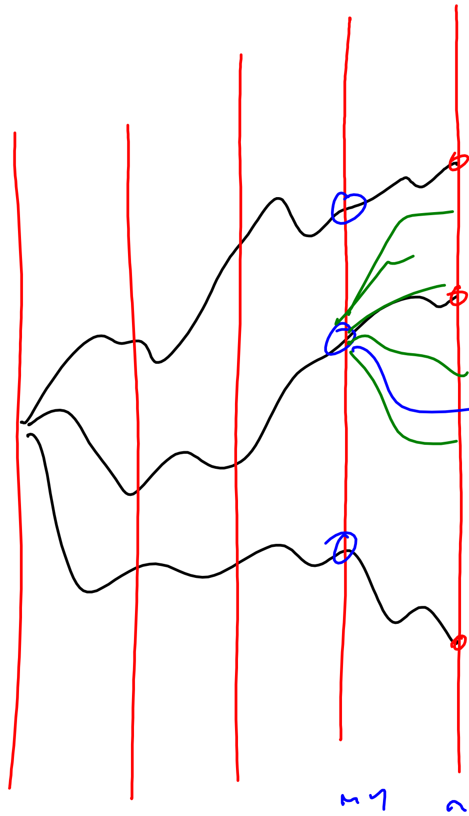
$$Z_t = \frac{F_t(T_1)}{F_t(T_2)} \quad \text{is a } Q^* \text{-mtg.}$$

Tuesday, May 04, 2010
12:08 PM



$$A = \begin{pmatrix} -0.5 & 0.5 \\ 0.1 & -0.1 \end{pmatrix}$$

Tuesday, May 04, 2010
12:34 PM



$$\max\left(\mathbb{E}_{n-1}\left[\phi(S_n) \right], \ \phi(S_{n-1}) \right)$$

$$\uparrow \quad \hat{V}^{i}_{n-1} \longrightarrow 1, \ S, \ S^2$$