MTH9831

HW5

Weiyi Chen

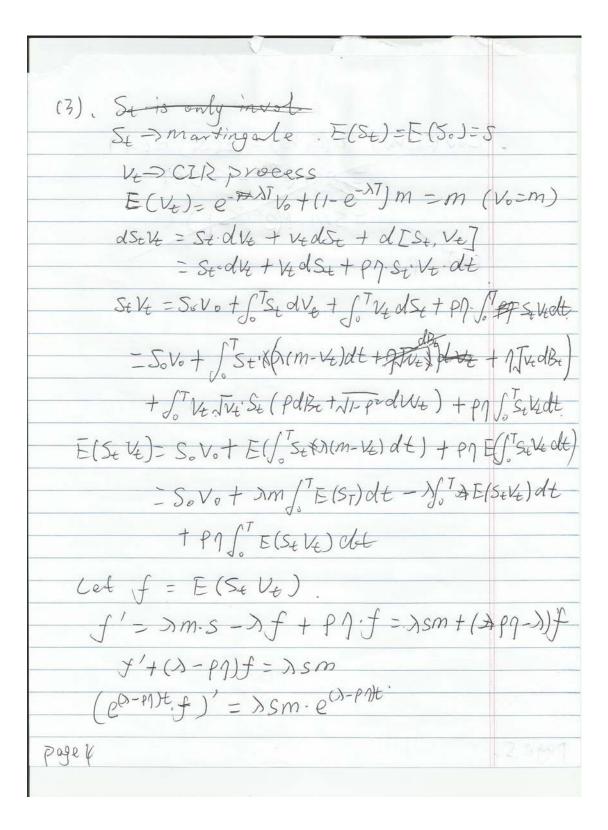
Zhenfeng Liang

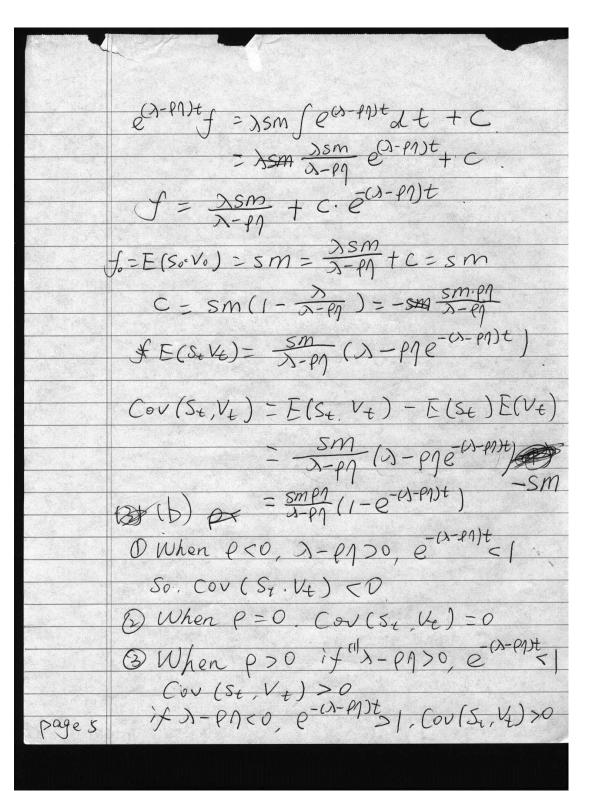
Mo Shen

Page 1. (1) du = 1 3 Br(t) dBr(t)  $[dW_{t}]_{t} = \left(\frac{1}{R} + \frac{2}{R} B_{R}(t) dB_{R}(t)\right) \left(\frac{1}{\sqrt{R}} B_{R}(t) dB_{R}(t)\right)$ Since we know dBi(t)-dBi(t)=0 for iti.
dBi(t)-dBi(t)=t [dw+]+ = F+ (B, (t) dB, (t)]+ B, (t) [dB, (t)]+ + ... Brite [d Bn(t)]+ = F. [ B, (t) + B, (t) + B, (t)] t (B) dR+ = d(\(\frac{2}{k}\) B\_k(t)) Let f(t, B, B2-BA) = 3Bkt) f+ f+ = 0 f= +2=2B, (t) f==2B, (t)  $f_{Bn} t = 2Bn(t) \qquad \forall f = \begin{bmatrix} 72B_1 \\ 2B_2 \end{bmatrix}$ 5º7 = 21 dR+= 7 [28, ] [dB, ] + { x2n.dt = 2 B, dB, +nott

dWt = FB Bx(t)dBx(t). 2 TR+ dW+ = 2 F Bx(+) dBx(+) So: dR+ = 2= Bx(t) dBx(t) + ndt (CC). X4 = JR+ - /2 Bit) Let f = Bilt  $\int_{t} = 0 \quad \int_{B_{1}} = \frac{1}{2} \left( \sum_{k=1}^{n} B_{k}^{2}(t) \right)^{\frac{1}{2}} 2B_{1} = B_{1} \cdot \left( \sum_{k=1}^{n} B_{k}^{2}(t) \right)^{-\frac{1}{2}}$   $\nabla f = \int_{B_{1}} B_{k}^{2}(t) \int_{E_{1}} B_{k}^{2}(t) \int_{E_{2}} B_{k}^{2$ 2 = f = (2 Bk(t)) + Bi (-2)(2 Bkt) 2 Bi  $-\left(\frac{y}{k_{\mathrm{B}}},B_{\mathrm{K}}^{2}(t)\right)^{\frac{1}{2}}\left(1-B_{\mathrm{I}}^{2}\left(\frac{y}{k_{\mathrm{B}}}B_{\mathrm{K}}^{2}(t)\right)^{-1}\right).$  $\# D^{2} f = (\frac{2}{2} B_{\mu}(t))^{2} \left( n - \frac{B_{i}^{2} + B_{i}^{2} + \dots + B_{n}^{2}}{(\frac{2}{2} B_{\mu}^{2}(t))} \right)$  $=(n-1)(\frac{1}{k}B_{k}^{2}(t))^{-\frac{1}{2}}$ . dXt = \frac{1}{2}(n-1)(\frac{2}{kz}\beta\_klt))^{-2}dt + \frac{1}{kz}\beta\_kdB\_k =\frac{n-1}{2Xt}dt + \frac{1}{kz}\beta\_kdB\_k page 2.

	The second secon
	$dW_{t} = \frac{1}{X_{t}} \underbrace{B_{k}(t)}_{B_{k}} \underbrace{B_{k}(t)}_{B_{k}} \underbrace{B_{k}(t)}_{B_{k}} \underbrace{B_{k}(t)}_{B_{k}} \underbrace{A_{t}}_{B_{k}} \underbrace{B_{k}(t)}_{B_{k}} \underbrace{A_{t}}_{B_{k}} $
3	- dXt
(5)	
	du = utdt + usds + uada
	+ & = uss d[s] + + = usa [d[a] + usa d[s,o]  = uedt + us (\$ s 6 = dB) + ua sid +
	+ 1 uss 5262dt + 2 uaa 52(dt)
	Tince (dt)2 ) 0, (dB:dt) -> 0.
	So, du = theat (ut + ua: S + = uss : So) dt + us: Sod!
	In ordracer to let u as a martingale,
	$\left(\frac{1}{10000000000000000000000000000000000$





under P, XNN (M, 52) Under \$ , 4x n N (0, 52) (b)  $dP/dY = (2\pi)^{-\frac{1}{2}}|Y|^{-\frac{1}{2}}\exp(-\frac{1}{2}(x^{\dagger}P^{-1}X))$ dp/dy = (27) = 2 | I | = 2 (x-11) = (x-11)  $\frac{d\hat{P}}{dP} = \exp\left(\frac{1}{2}\left((x-\mu)^{\frac{1}{2}}(x-\mu) - x^{\frac{1}{2}}(x)\right)\right)$ pageb