Black-Scholes Model
Errata

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page 8, line -4
Replace

$$u_t(t,z) = -\frac{1}{2}\sigma^2 x^2 u_{zz}(t,z) - rzu_x(t,z) + ru(t,z) \quad \text{for } 0 < t < T,\ z \in \mathbb{R}.$$

by

$$u_t(t,z) = -\frac{1}{2}\sigma^2 z^2 u_{zz}(t,z) - rzu_z(t,z) + ru(t,z) \quad \text{for } 0 < t < T,\ z \in \mathbb{R}.$$

page 19, line -10
Replace
Defintion 2.11
We say that $(x(t), y(t))$ is an **arbitrage opportunity** (or simply an arbitrage) if $V_{(x,y)}(0) = 0$, $V_{(x,y)}(t) \geq -L$, for all t and some constant L, and with positive probability $V_{(x,y)}(t') > 0$ for some t'.

by

Defintion 2.11
We say that a self-financing strategy $(x(t), y(t))$ is an **arbitrage opportunity** (or simply an arbitrage) if
1. $V_{(x,y)}(0) = 0$,
2. $V_{(x,y)}(t) \geq -L$, for all t and some constant L,
3. for some t', $V_{(x,y)}(t') \geq 0$ and with positive probability $V_{(x,y)}(t') > 0$.

page 20, line 14
Replace
Defintion 2.13
We say that $(x(t), y(t), z(t))$ is an **arbitrage** (in the extended market) if $V_{(x,y,z)}(0) = 0$, $V_{(x,y,z)}(t) \geq -L$, for all t and some constant L, and with positive probability $V_{(x,y,z)}(t') > 0$ for some t'.

by

Defintion 2.13

We say that a self-financing strategy $(x(t), y(t), z(t))$ is an **arbitrage** (in the extended market) if

1. $V_{(x,y,z)}(0) = 0$,
2. $V_{(x,y,z)}(t) \geq -L$, for all t and some constant L,
3. for some t', $V_{(x,y,z)}(t') \geq 0$ and with positive probability $V_{(x,y,z)}(t') > 0$.

page 55, line 9

Replace

$$= \mathbb{E}_Q(\mathrm{e}^{-r(T-t)} K \mathbf{1}_{\{S(T) \leq K\}} | \mathcal{F}_t) - \mathbb{E}_Q(\mathrm{e}^{-r(T-t)} S(T) \mathbf{1}_{\{S(T)-K\}} | \mathcal{F}_t)$$

by

$$= \mathbb{E}_Q(\mathrm{e}^{-r(T-t)} K \mathbf{1}_{\{S(T) \leq K\}} | \mathcal{F}_t) - \mathbb{E}_Q(\mathrm{e}^{-r(T-t)} S(T) \mathbf{1}_{\{S(T) \leq K\}} | \mathcal{F}_t)$$

page 66, line -4

Replace: $S(t + u) = x + \sigma W(u)$

by: $S(t + s) = x + \sigma W(s)$

page 66, line -2

Replace: $s < T$

by: $t < T$

page 67, line 1

Replace:

Then $u(t, x + \sigma W(T - t))$ is a martingale and

by:

Then $u(s, x + \sigma W(s - t))$ is a martingale for $s \in [t, T]$, and

page 67, line 7

Replace:

genereal

by:

general

page 124, line 14

Replace

$$u_t + rxu_z + \frac{1}{2}\sigma^2 z^2 u_{zz} = ru$$

by:

$$u_t + rzu_z + \frac{1}{2}\sigma^2 z^2 u_{zz} = ru$$

page 145, line 3
Replace:

$$= \exp\{-\frac{1}{2}\frac{(\mu - r)^2}{c_1^2 + c_2^2}T - (\mu - r)\frac{c_1}{c_1^2 + c_2^2}W_1(t) + (\mu - r)\frac{c_2}{c_1^2 + c_2^2}W_2(t)\}.$$

by

$$= \exp\{-\frac{1}{2}\frac{(\mu - r)^2}{c_1^2 + c_2^2}T - (\mu - r)\frac{c_1}{\sqrt{c_1^2 + c_2^2}}W_1(t) + (\mu - r)\frac{c_2}{\sqrt{c_1^2 + c_2^2}}W_2(t)\}.$$

page 148, line 11
Replace

$$S_i(t) = S_i(0)\exp\{\int_0^t \mu_i(t)dt - \frac{1}{2}\sum_{j,l=1}^{d}\int_0^t \sigma_{ij}^2(t)dt + \sum_{j=1}^{d}\int_0^t \sigma_{ij}(t)dW_j(t)\}$$

by

$$S_i(t) = S_i(0)\exp\{\int_0^t \mu_i(s)ds - \frac{1}{2}\sum_{j,l=1}^{d}\int_0^t \sigma_{ij}(s)\sigma_{lj}(s)ds + \sum_{j=1}^{d}\int_0^t \sigma_{ij}(s)dW_j(s)\}$$

page 150, lines 3-7
Replace dt by ds (twice)

page 153, line -8
Replace

$$[Y_1, Y_2](t) = \int_0^t (b_{11}(s)b_{21}(s) + b_{12}(s)b_{22}(s))\,ds.$$

by

$$[Y_1, Y_2](t) = \int_0^t (b_{11}(s)b_{12}(s) + b_{21}(s)b_{22}(s))\, ds.$$

page 165, line -4
Replace: $Y(t) = \frac{S_2(T)}{S_1(T)}$
by: $Y(T) = \frac{S_2(T)}{S_1(T)}$