# Assignment 2 Results report

Following will be the details of the results from Task 1 & 2:

Notes: The codes unlisted in the external files are recorded in this document

Values in red are results of the calculations

Explanations are recorded in #blue

import numpy as np #importing python modules

import pylab as p

#Establish parameters

mu=0.1;sigma=0.26;S0=39;n=n\_simulations=100

#Creating Brownian paths according to the parameters required.

t=np.linspace(0,3,n+1)

dB=p.randn(1,n+1)/p.sqrt(n);dB[:,0]=0

B=dB.cumsum(axis=1)

#Calculating stocks prices

mr=mu-0.5\*sigma\*sigma

St=p.zeros\_like(B);St[:,0]=S0

St[:,1:]=S0\*p.exp(mr\*t[1:]+sigma\*B[:,1:])

#Calculating mean and variance

p.mean(St[:,100])

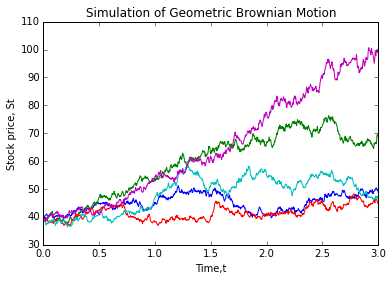
E[St[:,100]]= 41.032634100716976

p.var(St[:,100])

Var[St[:,1000]]=0.0 #Only one path was plotted hence no variations exist.

Task 1(b)

The graph of the simulated GBM is as follows



#Calculating mean and variance

Mean=py.mean(S[:,1000]) #Average of all stock prices from 5 simulations at time 3

Mean

E[S[:,1000]]= 62.110161885928775

Variance=py.var(S[:,1000]) #Variance of stock prices at time 3 which also refers to point No.1000

Variance

#The variance measure is indeed large coinciding with the large

gap between the lines at time=3.0. A plot of the average GBM

would be more meaningful for further analysis

Var[S[:,1000]]= 437.3556852528958

Calculating probabilities

mask=S[:,1000] > 39 #number of values more than 39

Probability=sum(mask)/n\_paths #retrieving values greater than 39.

print('P(S[:,1000]>39)=' + str(Probability))

P(S[:,1000]>39)= 1.0

#Calculating expectation

mask=S[:,1000] > 39 #number of values more than 39

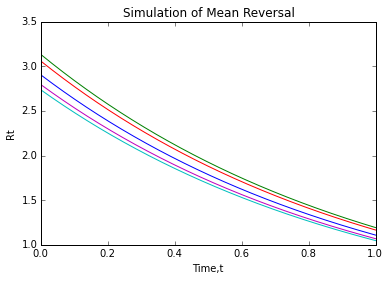
Probability = S[:,1000] \* mask #retrieving values greater than 39

Expectation= sum(Probability)/sum(mask)

print('E(S[:,1000]|S[:,1000]>39)=' + str(Expectation))

E(S[:,1000]|S[:,1000]>39)= 62.1101618859

Task 1(c) : Following is the graphed Mean Reverting SDE



E[R(1)]

p.mean(R[:,1000])

E[R(1)]= 1.1167160965034879

P[R(1)>2]

mask=R[:,1000] > 2

Probability=sum(mask)/n\_paths

print('P(R[:,1]>2)=' + str(Probability))

P(R[:,1]>2)=0.0

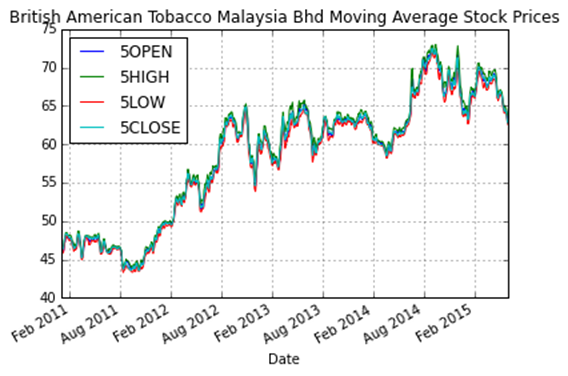
The FTSE Bursa Malaysia KLCI will consist of the largest 30 companies ranked by full market capitalisation, i.e. before the application of any investability weightings, in the FTSE Bursa Malaysia EMAS Index. The number of constituents in this index is fixed.

Source:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | ICB Supersector | Constituent Name | Code | Net Mcap (Billion) | PE Ratio | Weightage% |
| 1. | Banks | CIMB Group Holdings Berhad | 1023 | 46.69 | 17.57 | 4.661401915 |
| 2. | Banks | HONG LEONG BANK BHD | 5819 | 24.05 | 11.19 | 2.401086229 |
| 3. | Banks | HONG LEONG FINANCIAL GROUP BHD | 1082 | 16.22 | 9.96 | 1.619360442 |
| 4. | Banks | MALAYAN BANKING BHD | 1155 | 88.04 | 12.42 | 8.789672833 |
| 5. | Banks | PUBLIC BANK BHD | 1295 | 73.37 | 15.21 | 7.325060152 |
| 6. | Banks | RHB CAPITAL BHD | 1066 | 19.01 | 9.19 | 1.897906413 |
| 7. | Banks | AMMB HOLDINGS BHD | 1015 | 16.92 | 8.82 | 1.689246528 |
| 8. | Media | ASTRO MALAYSIA HOLDINGS BERHAD | 6399 | 15.76 | 28.32 | 1.5734353 |
| 9. | Telecommunications | AXIATA GROUP BERHAD | 6888 | 55.35 | 24.27 | 5.525992632 |
| 10. | Food & Beverage | BRITISH AMERICAN TOBACCO (M) | 4162 | 18.45 | 20.05 | 1.841997544 |
| 11. | Telecommunications | DIGI.COM BHD | 6947 | 41.83 | 21.02 | 4.176192806 |
| 12. | Travel & Leisure | GENTING BHD | 3182 | 30.75 | 16.44 | 3.069995907 |
| 13. | Travel & Leisure | GENTING MALAYSIA BERHAD | 4715 | 24.10 | 20.24 | 2.406078093 |
| 14. | Health care | IHH HEALTHCARE BERHAD | 5225 | 48.76 | 63.76 | 4.868065054 |
| 15. | Personal & Household Goods | IOI CORPORATION BHD | 1961 | 26.67 | 64.92 | 2.662659864 |
| 16. | Real Estate | KLCC PROP&REITS-STAPLED SEC | 5235SS | 12.73 | 26.6 | 1.270928387 |
| 17. | Industrial Goods & Services | KUALA LUMPUR KEPONG BHD | 2445 | 23.98 | 29.21 | 2.394097621 |
| 18. | Telecommunications | MAXIS BERHAD | 6012 | 49.41 | 30.18 | 4.932959276 |
| 19. | Industrial Goods & Services | MISC BHD | 3816 | 35.26 | 15.99 | 3.520261973 |
| 20. | Chemicals | PETRONAS CHEMICALS GROUP BHD | 5183 | 50.64 | 21.83 | 5.055759113 |
| 21. | Oil & Gas | PETRONAS DAGANGAN BHD | 5681 | 20.45 | 37.01 | 2.041672075 |
| 22. | Oil & Gas | PETRONAS GAS BHD | 6033 | 42.74 | 22.78 | 4.267044717 |
| 23. | Food & Beverages | PPB GROUP BHD | 4065 | 18.23 | 18.14 | 1.820033346 |
| 24. | Oil & Gas | SAPURAKENCANA PETROLEUM BHD | 5218 | 14.27 | 12.07 | 1.424677775 |
| 25. | General Industries | SIME DARBY BHD | 4197 | 51.42 | 20.53 | 5.13363218 |
| 26. | Telecommunications | TELEKOM MALAYSIA BHD | 4863 | 24.66 | 32.5 | 2.461986961 |
| 27. | Utilities | TENAGA NASIONAL BHD | 5347 | 69.3 | 9.25 | 6.918722482 |
| 28. | Automobile & Parts | UMW HOLDINGS BHD | 4588 | 11.99 | 20.6 | 1.19704881 |
| 29. | Industrial Goods & Services | WESTPORTS HOLDINGS BERHAD | 5246 | 13.91 | N/A | 1.38873636 |
| 30. | Utilities | YTL CORPORATION BHD | 4677 | 16.67 | 14.81 | 1.664287212 |

Source: Note: The constituents list was last updated on 22 June 2015 (http://www.bursamalaysia.com/misc/system/equity\_market\_statistics/FBMKLCI.pdf)

Task 2(b): Following shows the simple moving average of stock 4162.KL (British American Tobacco Malaysia Bhd)



#Calculating the correlation of FTSEKLCI with BATM

Out[48]:

5CLOSE NaN

#Since the Simple Moving Averages were not

calculated for the FTSEKLCI, there is no results to show

5HIGH NaN

5LOW NaN

5OPEN NaN

Adj Close 0.903636

Close 0.889367

#BATM appears to be highly correlated with the FTSEKLCI

with correlation >80%. Perhaps additional correlation

measures should be applied to gain a better perspective

High 0.885543

Low 0.893789

Open 0.889828

Volume 0.287579

dtype: float64