

MA323(Lab-07)

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Mathematics and Computing

Problem 01

Stock values are downloaded from given link and read in python using File I/O.

Value of Drift Coefficient and Diffusion Coefficient calculated are calculated using given formulae(in Assignment).

Drift Coefficient= 0.000298

Diffusion Coefficient= 0.22282

Then for each Date(7th October, 14th October, 21st October), 1000 values are calculated using Box-Muller method(for $N(0,1)$). Then using below mentioned formulae, Expected value of Stock is calculated.

$$S(t_{i+1}) = S(t_i) \exp \left(\left(\mu - \frac{1}{2}\sigma^2 \right) (t_{i+1} - t_i) + \sigma \sqrt{t_{i+1} - t_i} Z_{i+1} \right),$$

$$i = 0, 1, 2, \dots, n-1$$

With Z_1, Z_2, \dots, Z_n being independent $N(0,1)$ variables.

Below is a table showing Expected and Actual Value of Stock Price.

Date	Calculated(Expected) Value of Stock Price	Actual Value of Stock Prize
7th October, 2020	186.067777	190.70
14th October, 2020	185.861657	200.05
21st October, 2020	185.837786	203.75

Problem 02

Percentage Error was calculated for all 3 dates using formula:

$((\text{Actual Value} - \text{Expected Value}) / \text{Actual Value}) * 100$

Date	Percentage Error
7th October, 2020	2.429063%
14th October, 2020	7.092399%
21st October, 2020	8.791271%

Screenshot of output of code is shown on right side

```
jatin@jatin-Lenovo-ideapad-330-15IK8:~/Desktop/Sen/MonteCarlo/7$ python 180123060_JATIN_Code.py
Value of Drift Coefficient= 0.000298
Value of Diffusion Coefficient= 0.022282

7th October, 2020
Expected Value: 186.067777
Actual Value: 190.70
Percentage Error: 2.429063%

14th October, 2020
Expected Value: 185.861657
Actual Value: 200.05
Percentage Error: 7.092399%

21th October, 2020
Expected Value: 185.837786
Actual Value: 203.75
Percentage Error: 8.791271%

jatin@jatin-Lenovo-ideapad-330-15IK8:~/Desktop/Sen/MonteCarlo/7$
```