MA323(Lab-08)

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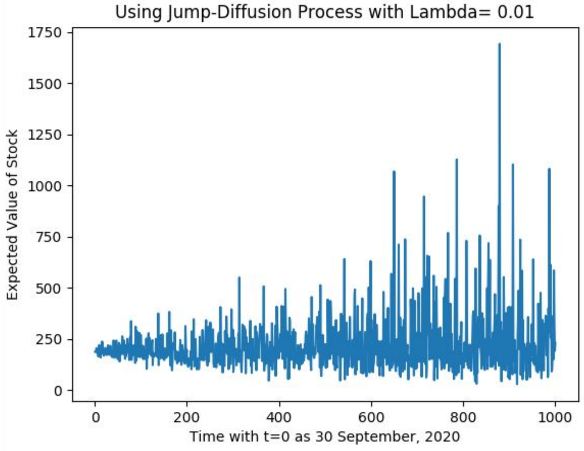
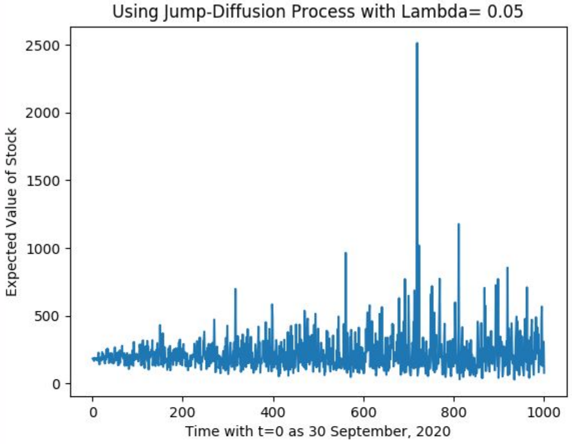
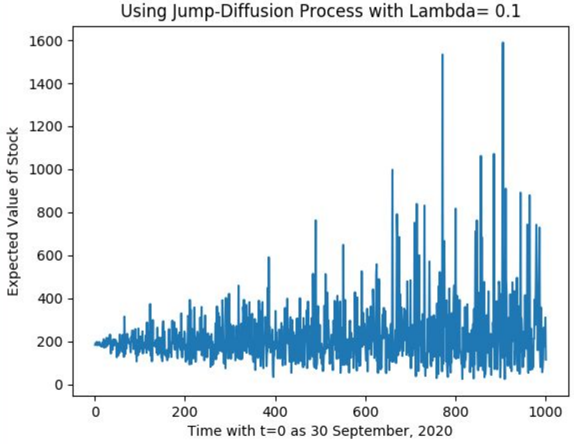
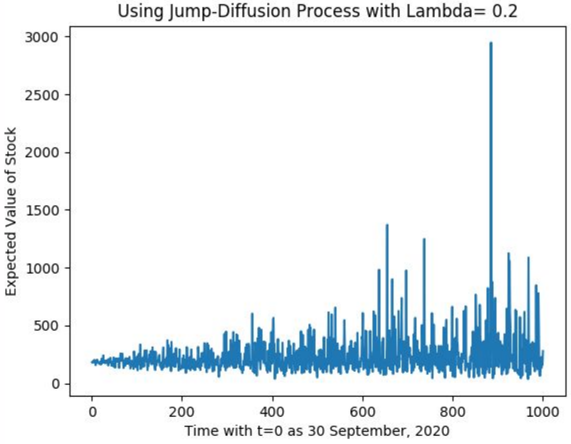
Value of Drift and Diffusion Coefficient are 0.000298 and 0.022282 respectively (as calculated in previous Lab).
Taking t= 0 as 30 September, 2020 and S(0)= Stock Value at t= 0,
Then using Jump-Diffusion Process, Expected Value of Stock prices is calculated for 1000 different days and for 4 different Lambda(as given in Assignment).
Then using Matplotlib, Graphs are drawn for 4 different Lambdas.









Algorithm used is shown on right side:

First of all, N is found out using Poisson distribution.
Then corresponding to value of N, M is calculated(where logY satisfies Normal distribution).
Z is found out using Box-Muller method(N(0, 1)).
Then approximate value of Stock is calculated corresponding to that Lambda and that particular day..

1. Generate $Z \sim N(0,1)$
2. Generate $N \sim \text{Poisson}(\lambda(t_{i+1}-t_i))$
   If $N=0$, set $M=0$ and go to step 4
3. Generate $\log Y_1, \log Y_2, \dots \log Y_N$ from their common distribution and set $M = \log Y_1 + \log Y_2 + \dots + \log Y_N$
4. Set $X(t_{i+1}) = X(t_i) + (\mu - \frac{1}{2}\sigma^2)(t_{i+1}-t_i) + \sigma\sqrt{t_{i+1}-t_i}\, Z_i + M$

Note that here, we have used the property that $N(t_{i+1})-N(t_i)$