Stock and Options Simulations[1,2]

by Weiwei Kong

Simulation of Stock ABC and European Options
$t=730\ (days),\ \sigma=0.2,\ r=0.04,\ S_0=1000.0,\ K=1013.4226186,\ mo=True,\ bf=True$

Simulation of 15 Stocks
$t=1460\ (days),\ \sigma_{avg}=0.00132693032627,\ r=0.04,\ S_0=1000.0,\ E_t[S_0]=1173.50673849,\ mo=False,\ bf=False$

European Options Simulation
$t=4.0\ (months),\ \sigma=0.3,\ r=0.04,\ S_0=1000.0,\ K=1013.4226186$

European Options Simulation
$t=4.0\ (months),\ \sigma=0.1,\ r=0.04,\ S_0=1000.0,\ K=1013.4226186$

European Options Simulation
$t=4.0\ (months),\ \sigma=0.3,\ r=0.04,\ S_0=1000.0,\ K=1013.4226186$
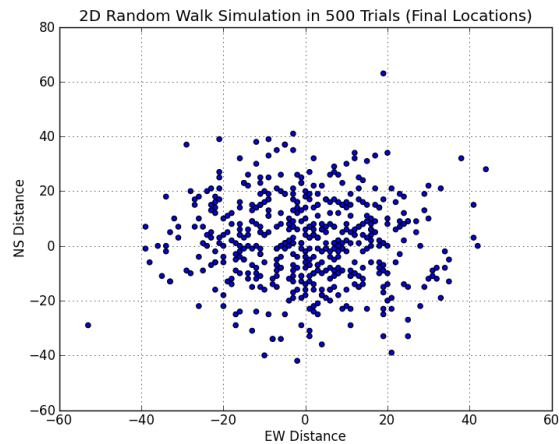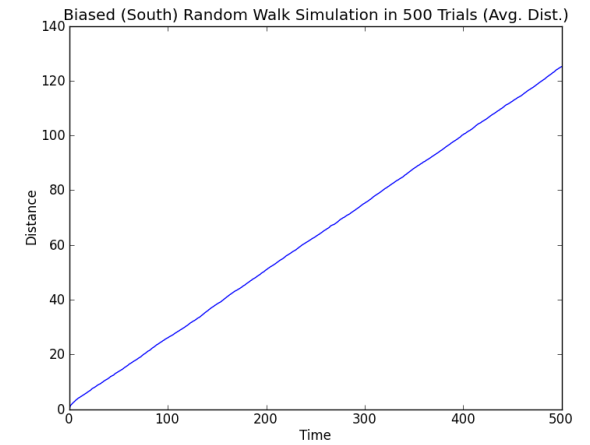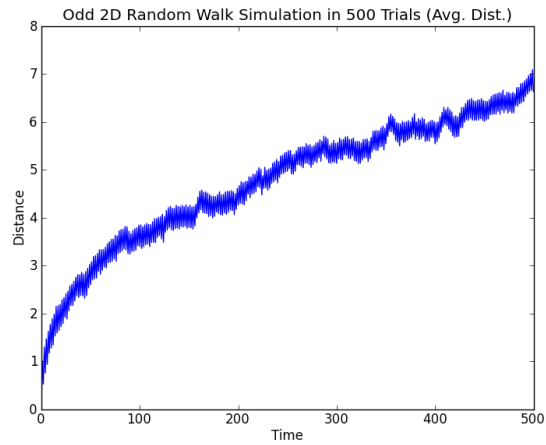

The code can be found at:

http://bit.ly/tMH6Dh

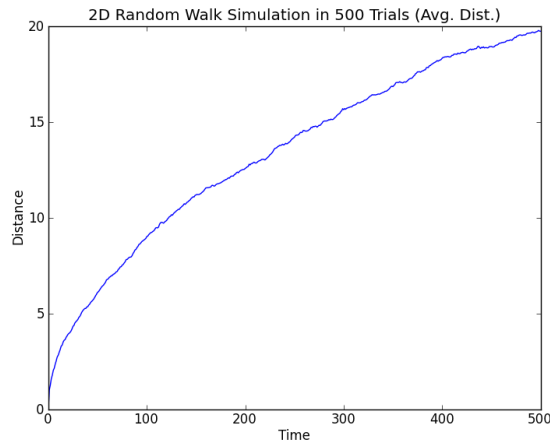[1]Stock simulations are running under a log-normal process with $S_t = S_0 \cdot exp\left(\int_0^t \left(\mu - \frac{\sigma^2}{2}\right) du + \int_0^t \sigma\, dW\right)$ where μ is the risk-free interest rate, σ is the volatility of the stock and W is a one-dimensional Wiener process.

[2]The options simulations are running under a standard Black-Scholes model.

Biased Random Walk Simulations[34]

by Weiwei Kong

2D Random Walk Simulation in 500 Trials (Avg. Dist.)

Odd 2D Random Walk Simulation in 500 Trials (Avg. Dist.)

Biased (South) Random Walk Simulation in 500 Trials (Avg. Dist.)

2D Random Walk Simulation in 500 Trials (Final Locations)

Odd 2D Random Walk Simulation in 500 Trials (Final Locations)

2D Random Walk Simulation in 500 Trials (Distribution of NS Values)

The code can be found at:

http://bit.ly/tMH6Dh

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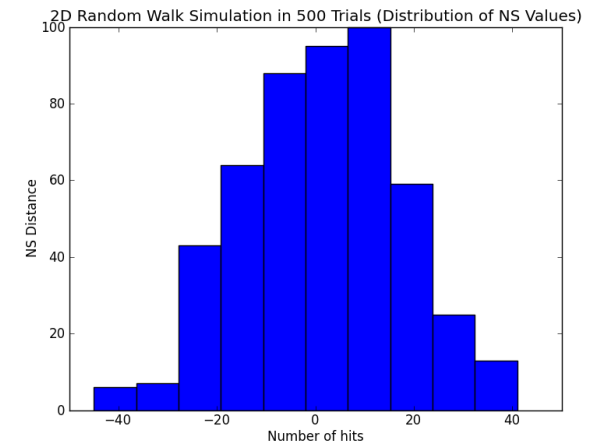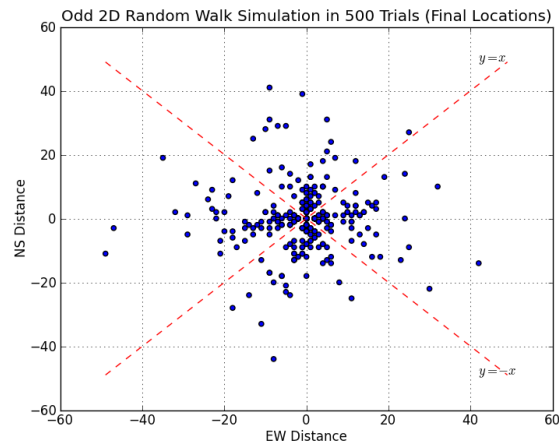
[3]All random walks are either a one-dimensional or two dimensional Wiener process

[4]'Odd' simulations are simulations where particles are jettisoned back to the origin if they cross either the $y = x$ or $y = -x$ lines.