% AsianMC.m

function [P,CI] = AsianMC(S0,X,r,T,sigma,NSamples,NRepl)

Payoff = zeros(NRepl,1);

for i=1:NRepl

Path=AssetPaths1(S0,r,sigma,T,NSamples,1);

Payoff(i) = max(0, mean(X - Path(2:(NSamples+1))));

end

[P,aux,CI] = normfit( exp(-r\*T) \* Payoff);

% AsianMCCV.m

function [P,CI] = AsianMCCV(S0,X,r,T,sigma,NSamples,NRepl,NPilot)

% pilot replications to set control parameter

TryPath=AssetPaths1(S0,r,sigma,T,NSamples,NPilot);

StockSum = sum(TryPath,2);

PP = mean(TryPath(:,2:(NSamples+1)) , 2);

TryPayoff = exp(-r\*T) \* max(0, X - PP);

MatCov = cov(StockSum, TryPayoff);

c = - MatCov(1,2) / var(StockSum);

dt = T / NSamples;

ExpSum = S0 \* (1 - exp((NSamples + 1)\*r\*dt)) / (1 - exp(r\*dt));

% MC run

ControlVars = zeros(NRepl,1);

for i=1:NRepl

StockPath = AssetPaths1(S0,r,sigma,T,NSamples,1);

Payoff = exp(-r\*T) \* max(0, mean(StockPath(2:(NSamples+1))-X));

ControlVars(i) = Payoff + c \* (sum(StockPath) - ExpSum);

end

[P,aux,CI] = normfit(ControlVars);

>> CompAsianMCCV

PMC =

2.7466

CIMC =

2.7116

2.7817

ans =

0.0700

PMCCV =

4.0163

CIMCCV =

3.9333

4.0992

ans =

0.1659

>>

%LookbackHalton.m

function[P,CI] = LookbackHalton(S0,r,T,sigma,NSteps,NRepl)

Payoff = zeros(NRepl,1);

Path = HaltonPaths(S0,r,sigma,T,NSteps,NRepl);

SMax = max(Path,[],2)

%SMin = min(Path,[],2);

Payoff = max(0,SMax-Path(NSteps+1));

%Payoff = max(0,Path(NSteps+1)-SMin);

[P,aux,CI] = normfit(exp(-r\*T)\*Payoff);

%LookbackMC.m

function[P,CI] = LookbackMC(S0,r,T,sigma,NSteps,NRepl)

Payoff = zeros(NRepl,1);

for i = 1:NRepl

Path = AssetPaths1(S0,r,sigma,T,NSteps,1);

SMax = max(Path);

%SMin = min(Path);

Payoff(i) = max(0,SMax-Path(NSteps+1));

%Payoff(i) = max(0,Path(NSteps+1)-SMin);

end

[P,aux,CI] = normfit(exp(-r\*T)\*Payoff);

end

>> CompLookbackMCHalton

PMC =

14.1208

PHalton =

6.8937e+10