
MAE 6258 HW7

```
%Randy Schur
%3/18/15
clear

n = 1000;
meanx = 0; varx = 1;
x = meanx + varx*randn(1000, 1);

N = [10 20 50 100];
avg = zeros(100,4);

%a
for j = 1:length(N)
    for i= 1:(n/N(j))
        avg(i, j) = mean( x((i-1)*N(j)+1 : i*N(j)) );
    end
end

mofm(1) = mean(avg(:,1));
vofm(1) = var(avg(:,1));
mofm(2) = mean(avg(1:n/N(2),2));
vofm(2) = var(avg(1:n/N(2),2));
mofm(3) = mean(avg(1:n/N(3),3));
vofm(3) = var(avg(1:n/N(3),3));
mofm(4) = mean(avg(1:n/N(4),4));
vofm(4) = var(avg(1:n/N(4),4));

figure(1)
plot(N, mofm, 'o', N, [0 0 0 0])
axis([0, 100, min(mofm)-0.1, max(mofm)+0.1 ])
title('Mean Values')
xlabel('Sample Size')
ylabel('mean value of sample mean')
legend('calculated', 'theoretical')
figure(2)
var_theory = varx.^2./N;
plot(N,vofm, 'o', N, var_theory)
axis([0, 100, min(vofm)-0.1, max(vofm)+0.1 ])
title('Mean Values - variances')
xlabel('Sample Size')
ylabel('variance of sample mean')
legend('calculated', 'theoretical')

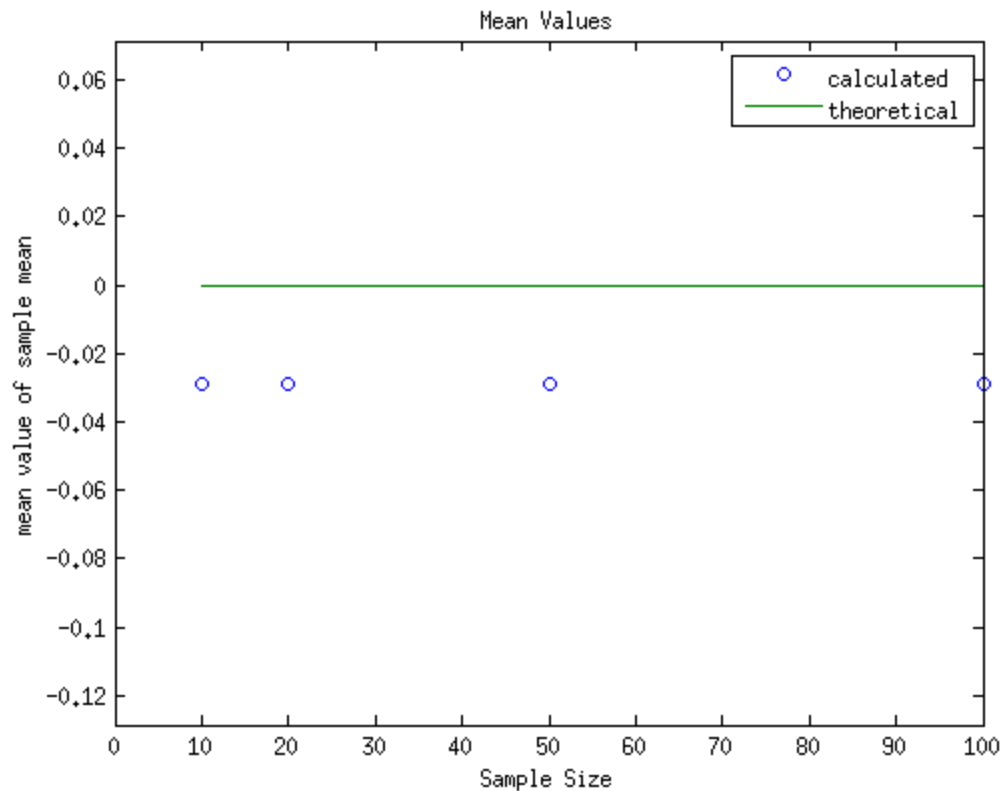
%b

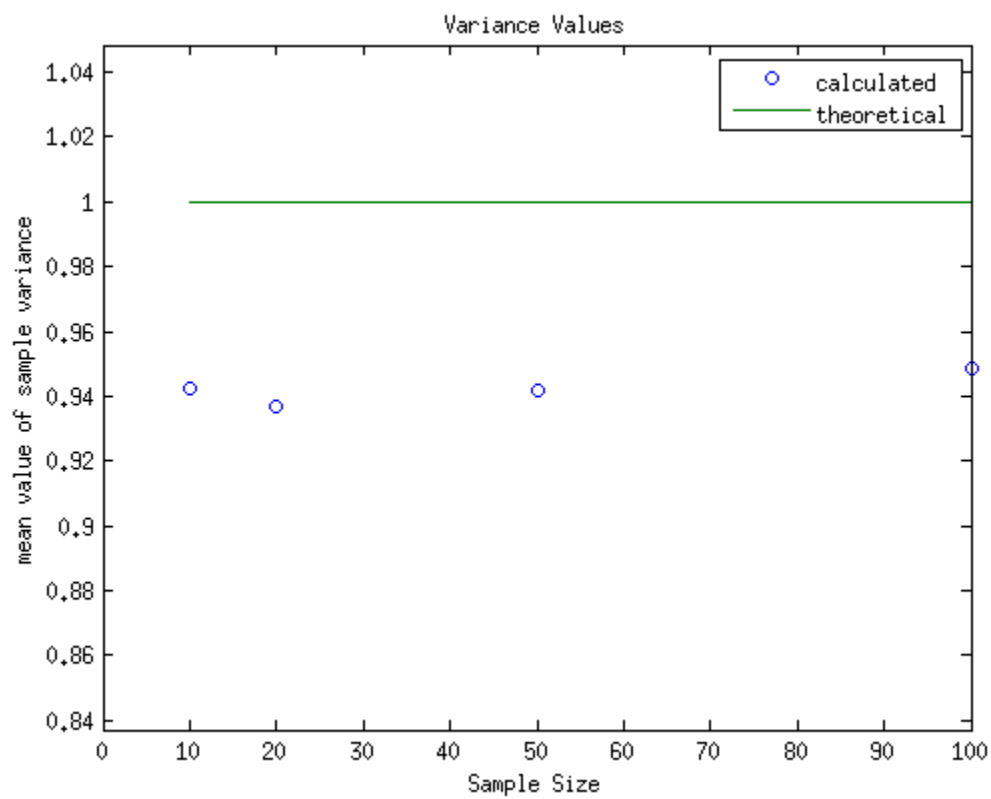
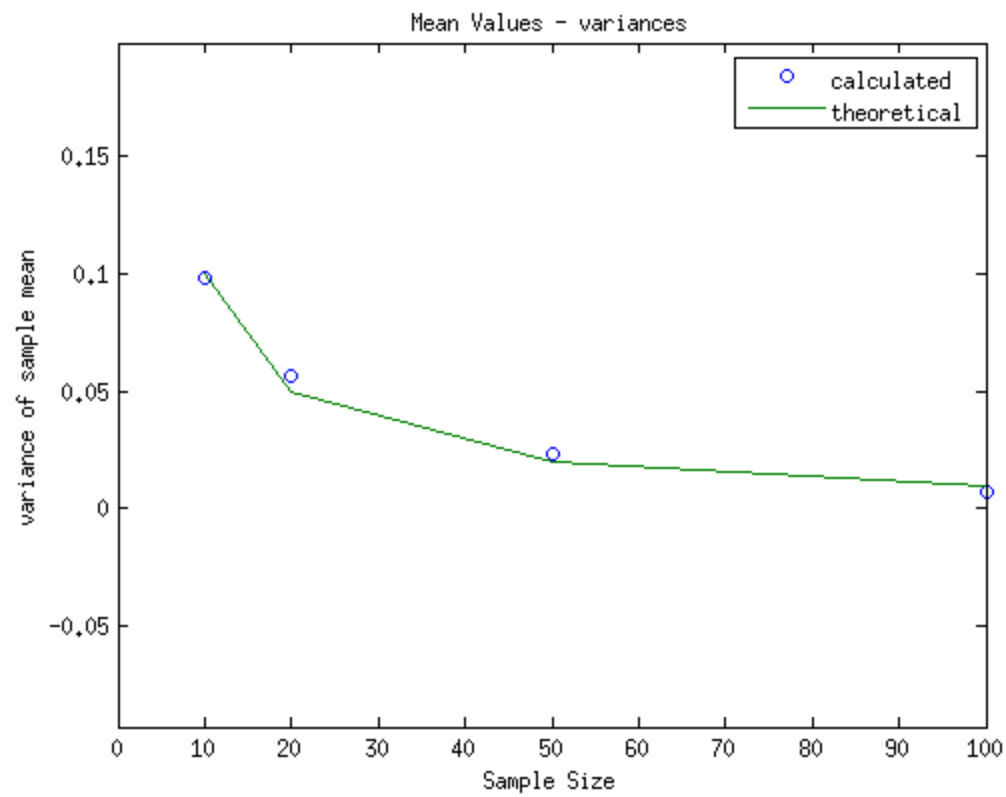
vars = zeros(100,4);
for j = 1:length(N)
    for i= 1:(n/N(j))
        vars(i, j) = var( x((i-1)*N(j)+1 : i*N(j)) );
    end
end
```

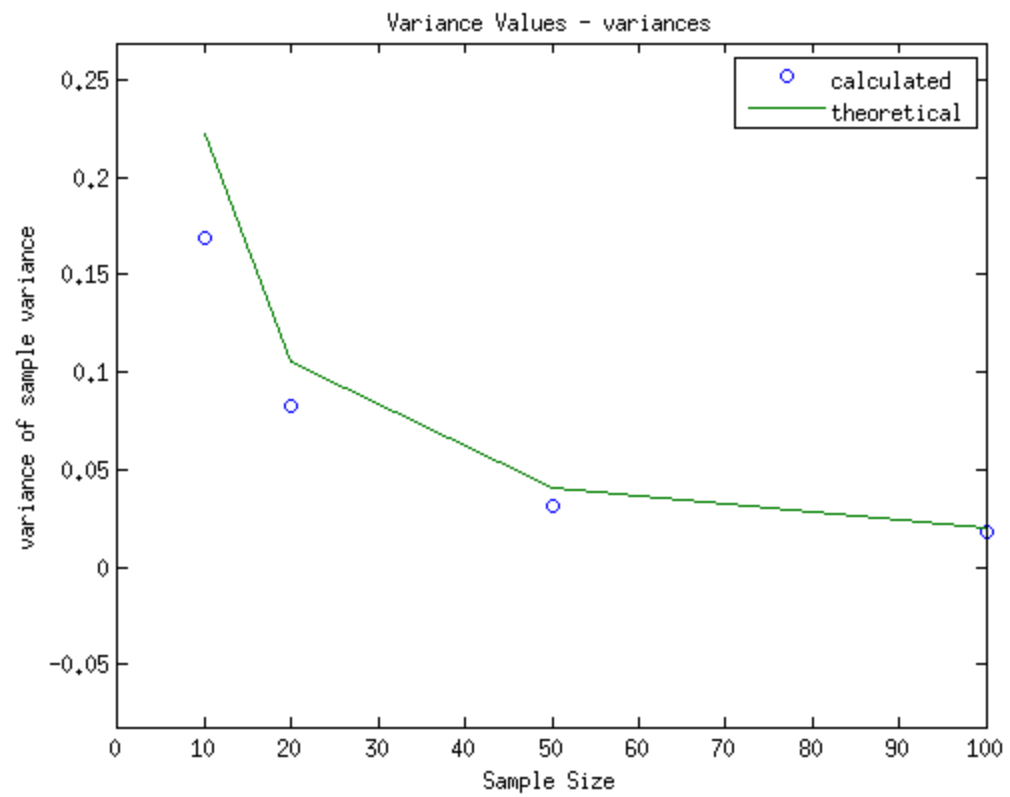
```

mofv(1) = mean(vars(:,1));
vofv(1) = var(vars(:,1));
mofv(2) = mean(vars(1:n/N(2),2));
vofv(2) = var(vars(1:n/N(2),2));
mofv(3) = mean(vars(1:n/N(3),3));
vofv(3) = var(vars(1:n/N(3),3));
mofv(4) = mean(vars(1:n/N(4),4));
vofv(4) = var(vars(1:n/N(4),4));
figure(3)
plot(N, mofv, 'o', N, [1 1 1 1])
axis([0, 100, min(mofv)-0.1, max(mofv)+0.1 ])
title('Variance Values')
xlabel('Sample Size')
ylabel('mean value of sample variance')
legend('calculated', 'theoretical')
figure(4)
varv_theory = 1./N.*(3*varx - (N-3)./(N-1)*(varx^2)^2);
plot(N,vofv, 'o', N, varv_theory)
axis([0, 100, min(vofv)-0.1, max(vofv)+0.1 ])
title('Variance Values - variances')
xlabel('Sample Size')
ylabel('variance of sample variance')
legend('calculated', 'theoretical')

```







Published with MATLAB® R2013a