Joe Sinotte

clear

clc

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%% Question 1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

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load ('hw10\_1');

n = 15;

[M N] = size(X);

y = randsample(M,n,true);

for i = 1:n

j(i,:) = X(y(i),:);

end

x1 = j(:,1);

x2 = j(:,2);

mu\_x1 = mean(x1)

mu\_x2 = mean(x2)

cc1 = corrcoef(x1,x2)

%Bootstrap Sample

B = [25 50 100 200 500 1000 2000];

for j = 1:7;

for i = 1:B(j)

b(i,:) = randsample(M, n, true);

end

b1 = transpose(b);

for i = 1:B(j)

s = X(b1(:,1),:);

end

s1 = s(:,1);

s2 = s(:,2);

theta1(j) = mean(s1); %(1/B(j))\*sum(s1);

theta2(j) = mean(s2); %(1/B(j))\*sum(s2);

se1(j) = ((1/(B(j)-1))\*sum((s1-theta1(j)).^2))^.5;

se2(j) = ((1/(B(j)-1))\*sum((s2-theta2(j)).^2))^.5;

cc2(j) = corrcoef(theta1(j), theta2(j));

end

figure(1)

plot(se1)

xlabel('Sample Size (as an element of B)')

ylabel('Standar Errors')

figure(2)

plot(se2)

xlabel('Sample Size (as an element of B)')

ylabel('Standar Errors')

figure(3)

plot(theta1)

xlabel('Sample Size (as an element of B)')

ylabel('Mean')

figure(4)

plot(theta2)

xlabel('Sample Size (as an element of B)')

ylabel('Mean')

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%%%%%%%%%%%%%%%%%%%%%%%%%%%% Question 2 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

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X = [1 2 3.5 4 7 7.3 8.6 12.4 13.8 18.1];

x1 = transpose(X);

X1 = sort(X);

x = X1(3:8);

m = length(x);

B = [25 100 200 500 1000 2000];

for j = 1:6

for r = 1:B(j)

b(r,:) = randsample(X, 10, true);

end

b1 = transpose(b);

b2 = sort(b1);

b3 = b2(3:8,:);

theta1 = mean(b3);

theta2(j) = mean(theta1);

for ir = 1:B(j)

se(j) = ((1/(B(j)-1))\*sum((b3(:,r)-theta2(j)).^2))^.5;

end

end

theta3 = (1/(m-1))\*sum(x);

se3 = (1/(m-1))\*sum((x-theta3).^2)^.5;

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B = [25 100 200 500 1000 2000];

X = [1 2 3.5 4 7 7.3 8.6 12.4 13.8 18.1];

for i = 1:50

for j = 1:6

for r = 1:B(j)

b(r,:) = randsample(X, 10, true);

end

b1 = transpose(b);

b2 = sort(b1);

b3 = b2(3:8,:);

theta1 = mean(b3);

theta2(j) = mean(theta1);

for ir = 1:B(j)

se2(i,j) = ((1/(B(j)-1))\*sum((b3(:,r)-theta2(j)).^2))^.5;

end

end

end

se3 = transpose(se2);

figure(5)

plot(se3)

figure(5)

plot(theta4)

xlabel('Sample Size')

ylabel('Mean')

figure(6)

plot(se4)

xlabel('Sample Size')

ylabel('Standar Errors')

QUESTION 1:

mu\_x1 = 602.8667

mu\_x2 = 3.1480

cc1 =

1.0000 0.8826

0.8826 1.0000

Standard errors (for each value of B):

se1 = 35.4963 20.3889 7.6023 9.5533 5.2838 3.7894 3.3430

se2 = 0.1624 0.0891 0.0639 0.0380 0.0232 0.0230 0.0130

Histogram:



QUESTION 2:

Standard Errors (for each value of B):

se = 1.8330 0.9266 0.5200 0.4122 0.4384 0.2156



The variability in the estimates becomes very small between each of the 50 samples as B approaches 2000