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**Assignment 7**

***Part 1***

*Matlab Code*

ALPHA = 0.5;

N = 500;

x = 1:N;

y = ALPHA ./ ((x - 1) + ALPHA);

plot(x,y)



***Part 2***

*Matlab Code*

ALPHA = 0.5;

SIGMA = 0.1;

N = 500; % Total no. of customers

K = 1; % Current no. of occupied tables

TABLES = zeros(1,N);

TABLES(K) = 1;

THETA = zeros(2,N);

THETA(:,K) = [rand;rand];

for i = 2:N

table\_prob = zeros(1,K+1);

for k = 1:K

table\_prob(k) = TABLES(k)/(i-1+ALPHA);

end

table\_prob(K+1) = ALPHA/(i-1+ALPHA);

table\_chosen = find(mnrnd(1,table\_prob));

if TABLES(table\_chosen) == 0

K = K+1;

THETA(:,K) = [rand;rand];

end

TABLES(table\_chosen) = TABLES(table\_chosen)+1;

end

figure(1);

hold on;

for k = 1:K

cc=rand(1,3);

for j = 1:TABLES(k)

x = THETA(1,k) + SIGMA\*randn;

y = THETA(2,k) + SIGMA\*randn;

scatter(x,y,30,cc);

drawnow;

t = sprintf('%d Cluster',k);

title(t);

end

end

hold off;



