

```
K = 200;
N = 100;

w_k = 0.4+2.6*rand(N,K);
x_k = zeros(N,K);
x_k(:,1) = 1;

for i = 1:N
    for j = 1:K-1
        x_k(i,j+1)=x_k(i,j)*w_k(i,j);
    end
end

figure(1)
plot(x_k'); grid on;
title("Figure 1:  $X_{k+1} = W_k X_k$ ");
ylabel("X_{k+1}");
xlabel("Time");

figure(2)
semilogy(x_k'); grid on;
title("Figure 2:  $\log(X_{k+1}) = \log(W_k X_k)$ ");
ylabel("log(X_{k+1}) ");
xlabel("Time");

%%
a = 1e4;
A = x_k;
A(A<a) = inf;
[~,I] = min(A,[],2);

%%
figure(3)
histogram(I); grid on;
title("Figure 3: Histogram of  $T_{10^4} = \min\{k \geq 1 | X_k \geq 10^4\}$ ");
ylabel("Counts");
xlabel("k");
```