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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% EE-804 HW5 #1
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%lambda = 2;
%lambda = 1;
lambda = 1/4;

a = linspace(eps,20,100);
b = linspace(2/lambda,20,100); % used in chebyshev
c = linspace(1/lambda,20,100); % used in chernoff

P_true = exp(-lambda*a);
P_markov = 1/lambda./a;
P_cheby = 1./(lambda^2*(b-1/lambda).^2);
P_chern = exp(1-c*lambda).*(c*lambda);

handy = plot(a,P_markov,'r-.',...
             b,P_cheby,'k:',...
             c,P_chern,'g--',...
             a,P_true);
legend(handy,'Markov','Chebyshev','Chernoff','Exact');
tit_str = ['exponential, \lambda = ',num2str(lambda)];
title(tit_str);
xlabel('a');
ylabel('P(x\geq a)');

axis([1,20,0,1]);

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% EE-804 HW5 #6
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

r = linspace(-1.5,1.5,1000);

subplot(311)
sig2 = 0.01;
plot(r,tanh(r/sig2));
text(1.1,0.5,['\sigma^2 = ',num2str(sig2)])
grid on;
title('tanh(r/\sigma^2)');

subplot(312)
sig2 = 0.1;
plot(r,tanh(r/sig2));
text(1.1,0.5,['\sigma^2 = ',num2str(sig2)])
grid on;

subplot(313)
sig2 = 0.5;
plot(r,tanh(r/sig2));
text(1.1,0.5,['\sigma^2 = ',num2str(sig2)])
grid on;
```