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close all;
clear all;

f1 = 2;           %fréquence du signal x1
f2 = 5.34;        %fréquence diu signal x2
w1 = 2*pi*f1;     %pulsation signal x1
w2 = 2*pi*f2;     %pulsation signal x2
T1 = 1/f1;        %Periode sginal x1
T2 = 1/f2;        %Periode sginal x1
p1 = pi/4;        %Déphasage du signal x1
p2 = pi/3;        %Déphasage du signal x1

N = 256;
Te = 2/N;
Fe = 1/T2;

Tmax = (N-1)*Te;
time= 0:Te:Tmax;
x2 = 2*cos(w2*time+p2);
freq = (0:N-1)/(N*Te);
fx2 = fft(x2,N)*Te;

DSP2 = conj(fx2).*fx2/(N*Te);
x2Hann = x2.*hanning(N)';
fx2Hann = fft(x2Hann,N)*Te;
DSP2Hann = conj(fx2Hann).*fx2Hann/(N*Te);

figure(1);
subplot(2,1,1);
plot(time,x2,'k',time,x2Hann,'r');
xlabel('Temps (s)');
ylabel('X2,X2+Hanning (V)');
legend('x2','x2+Hanning');
title(sprintf('Te = %g ms',Te*1e3));
subplot(2,1,2);
semilogy(freq,DSP2,'bo');
title(sprintf('f2 = %g Hz Te = %g ms Fe = %g Hz',f2,Te*1e3,1/Te));
xlabel('Fréquence (Hz)');
ylabel('DSP (V^2/hZ)');
hold on;
semilogy(freq,DSP2Hann*8/3,'ro');
legend('x2','x2+Hanning');
grid on;
hold off;

puiss_f = sum(DSP2)*Fe/N;
puiss_t = x2*x2'/N;
disp(['puissance_x2_freq = ',num2str(puiss_f),' puissance_x2_temp = ',num2str(puiss_t)]);

puissance_x2_freq = 0.082318 puissance_x2_temp = 1.9732

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grid on;

