Lab 4

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| Introduction  In the lab, we learned the Continuous Time Fourier Transform. And we have three problems in the lab.  In 4.2, we learned how to compute the numerical approximation of CTFT.  Lab results & Analysis：  4.2        Here, , and  So,    tau=0.01;  T=10;  N=T/tau;  t=(0:tau:T-tau);  y=exp(-2 \* abs(t-5));    Y = fftshift(tau \* fft(y));  Here, we can use the fftshift to get the value of Y(jw).    w = -(pi/tau) + (0:N-1)\*(2\*pi / (N\*tau));  (The output is too large to put the screenshot here.)    X = exp(li\*5\*w).\*Y;  We can get that .    We can find that the difference of approximate X(jw) is small to theoretical X(jw) in low frequency, and is bigger in high frequency.      We can find that the abs magnitude of X(jw) and Y(jw) are same, but the angles are the different. The reason is that y(t) is time shifting of x(t).  代码：  代码：  4.2  % 4.2(a)  % 4.2(b)  tau=0.01;  T=10;  N=T/tau;  t=(0:tau:T-tau);  y=exp(-2 \* abs(t-5));  %4.2(c)  Y = fftshift(tau\*fft(y));  %4.2(d  w = -(pi/tau)+(0:N-1)\*(2\*pi/(N\*tau));  %4.2(e)  X = exp(1i\*5\*w).\*Y;  %4.2(f)  magnitudeX\_a = abs(X);  phaseX\_a = angle(X);  X2 = 1 ./ (2 + 1j \* w) + 1 ./ (2 - 1j \* w);  magnitudeX = abs(X2);  phaseX = angle(X2);  figure;  subplot(2, 1, 1);  semilogy(w, magnitudeX\_a , w, magnitudeX);  legend('approximation |X|', '|X| ', 'Location', 'northeast');  title('X magnitude and X approximation');  subplot(2, 1, 2);  hold on;  semilogy(w, phaseX\_a, w, phaseX);  legend('approximation |X|', '|X|', 'Location', 'northeast');  title('X phase and X approximation');  saveas(gcf, "P4\_2\_out1.png")  close;  %4.2(g)  magnitudeY = abs(Y);  phaseY = angle(Y);  figure;  subplot(2, 1, 1);  semilogy(w, magnitudeY , 'r--h',w, magnitudeX\_app, 'b');  legend('Y', 'X', 'Location', 'northeast');  title('magnitude of X and Y');  subplot(2, 1, 2);  hold on;  semilogy(w, phaseY, 'b');  semilogy(w, phaseX, 'g');  legend('Y', 'X', 'Location', 'northeast');  title('phase of X and Y');  saveas(gcf, "P4\_2\_out2.png")  Note: Please indicate meaning of the symbols in all expressions. Please indicate the coordinate and unit in all figures. | |
| Experience  You can write your experience with this project. Any comment and suggestion on this course are also very welcome. | |
| Score |  |

字体：英文Times new Roman；中文宋体，正文五号

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