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1/6/22 cosc 360

Homework #1

$$1. \quad Z = \frac{(x_1 + jx_1)(x_2 - jx_2)}{(x_2 + jx_2)(x_2 - jx_2)}$$

$$Z = \frac{x_1x_2 - jx_1x_2 + jx_1x_2 + x_1x_2}{(x_2^2 + x_2^2)}$$

$$Z = \frac{(x_1x_2 + x_1x_2)}{(x_2^2 + x_2^2)} + j \frac{(x_1x_2 - x_1x_2)}{(x_2^2 + x_2^2)}$$

$$Z^* = \left(\frac{(x_1x_2 + x_1x_2)}{(x_2^2 + x_2^2)} - j \frac{(-x_1x_2 - x_1x_2)}{(x_2^2 + x_2^2)} \right)$$

$$Z^* = \frac{(x_1 - jx_1)}{(x_2 - jx_2)}$$

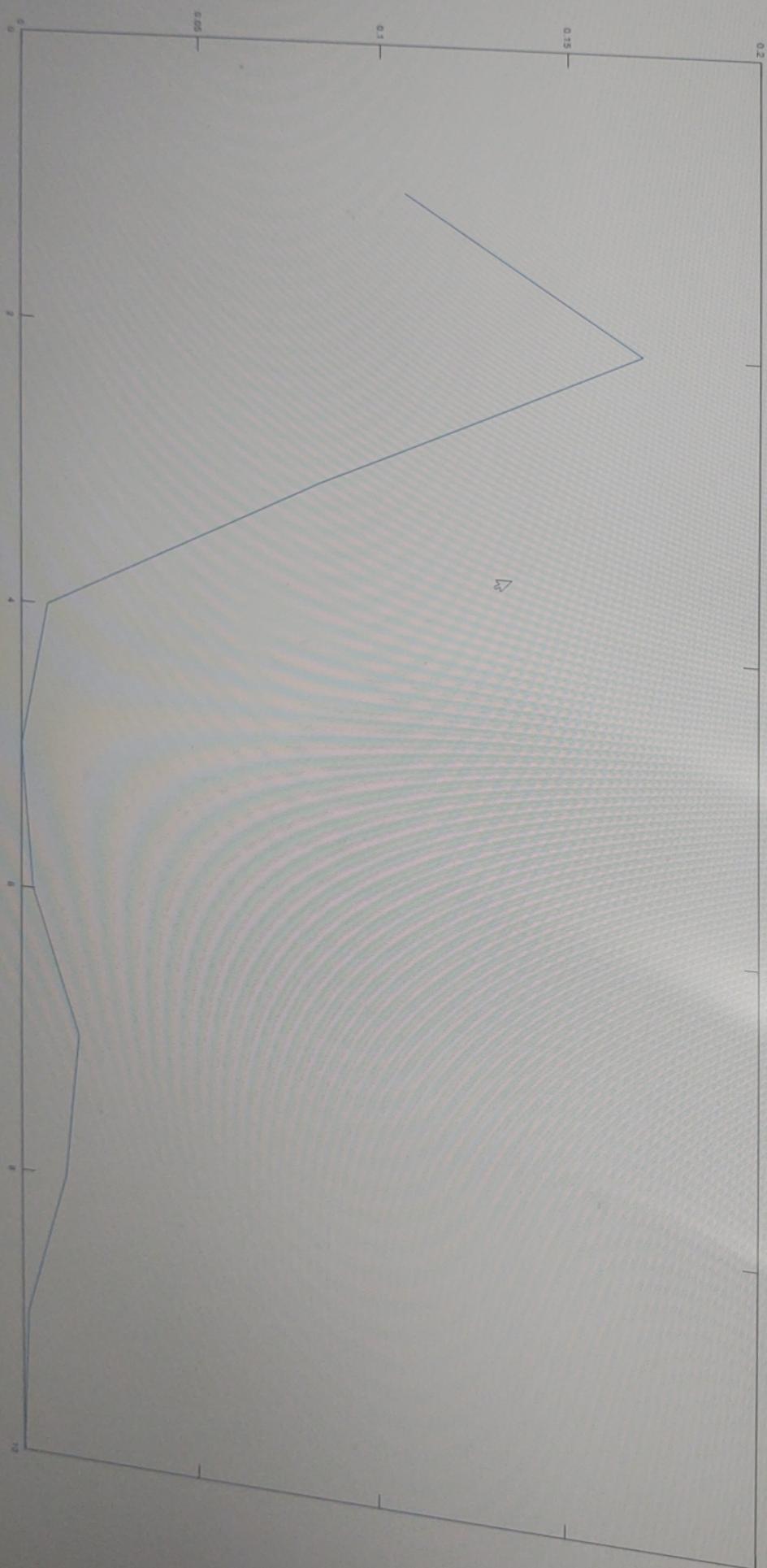
$$2. \cos(x) = \frac{1}{2}(e^{jx} + e^{-jx})$$

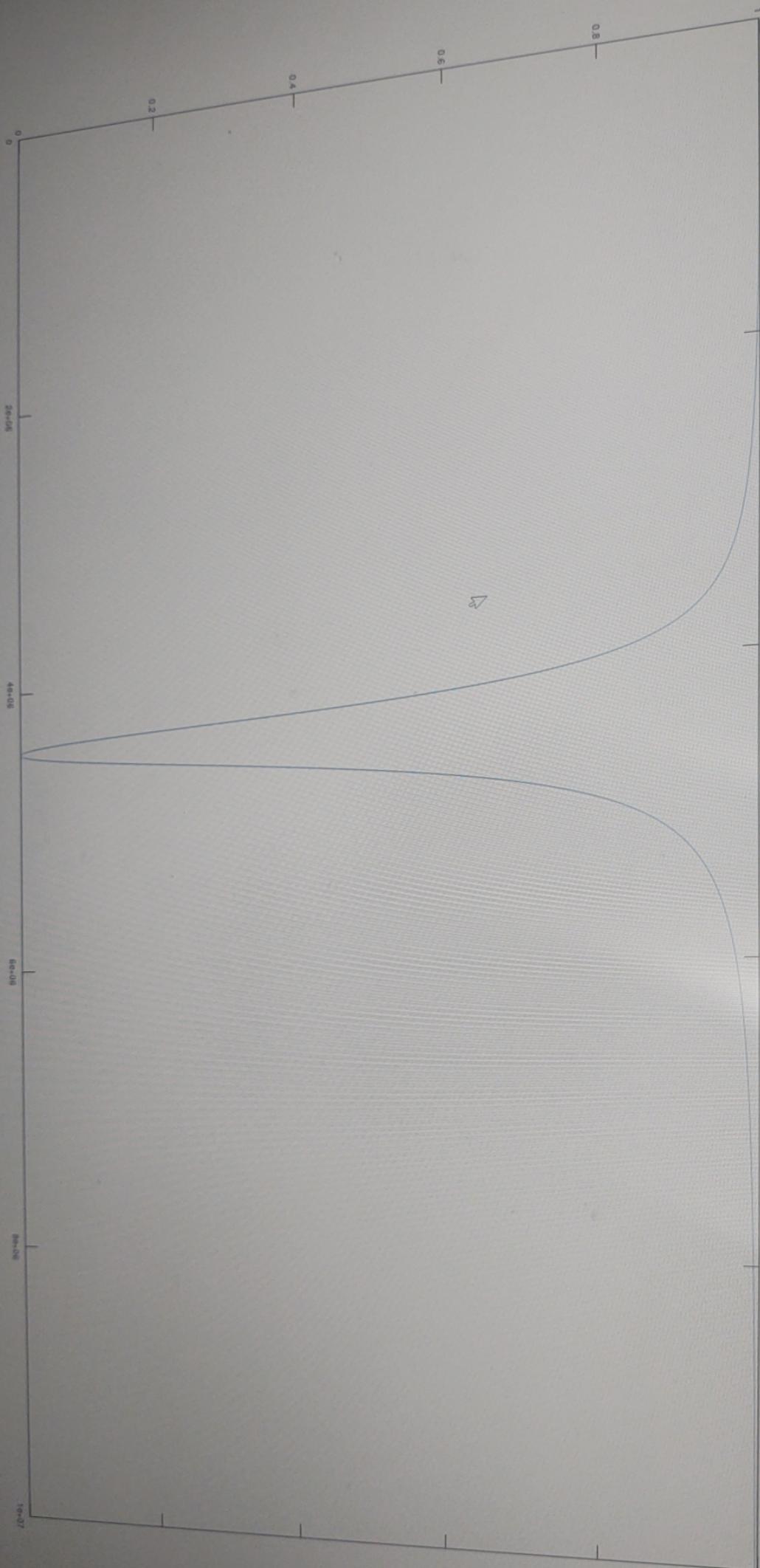
$$\cos(x) = \frac{1}{2} \left[\left(\sum_{n=0}^{\infty} (-1)^n \frac{j^{2n}}{(2n)!} + j \sum_{n=0}^{\infty} \frac{j^{2n+1}}{(2n+1)!} \right) + \left(\sum_{n=0}^{\infty} (-1)^n \frac{j^{2n}}{(2n)!} + j \sum_{n=0}^{\infty} \frac{j^{2n+1}}{(2n+1)!} \right)^{-1} \right]$$

$$\cos(x) = \frac{1}{2} [\cos(x) + \sin(x)j + \cos(x) - \sin(x)j]$$

$$\cos(x) = \frac{1}{2} [x\cos(x)]$$

$$\cos(x) = \cos(x) \checkmark$$





a = 50;
b = 30;
c = pi/3;

omega = [0.0:1.0:10.0];

k = sin(omega*c*b/a);
d = k.^4 + (omega).^2;
x = k.^4;
y = k.^2.*omega;
h = x./d - i*y./d;

plot(omega,h);

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1 R = 50.0;
2 C = 470.0e-12;
3 L = 2.0*54.0e-6;
4 |
5 omega = [0.0:1.0e3:10.0e6];
6 k = sqrt(1-(omega/(1.0/(sqrt(L*C)))) ,^2);
7 d = k.^4+(omega*R*C),^2;
8 x = k.^4;
9 y = k.^2.*omega*R*C;
10 h = x./d - i*y./d;
11
12 plot(omega,h)
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