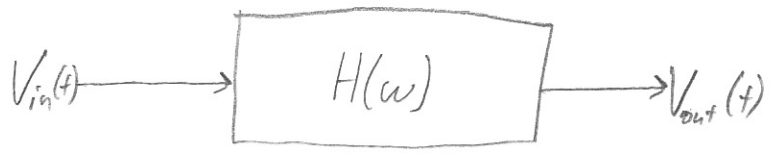
EE16B Section 9B

10/30/15

Warmup

1)



$$H(\omega) = \frac{5}{1 - j\omega \cdot 10^{-4}} \qquad V_{in}(t) = \cos(10t) + \cos(20000t)$$

Find $V_{out}(t)$

Solution

Find $|H(\omega)|$, $\angle H(\omega)$ at each frequency of interest:

$$|H(10)| \approx 5 \qquad \angle H(10) \approx 0$$

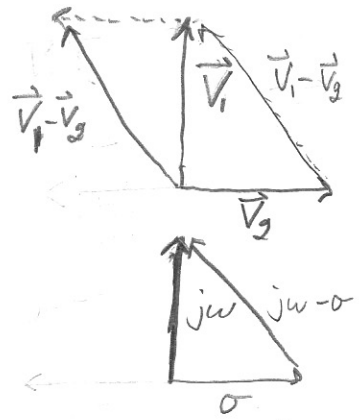
$$|H(2 \cdot 10^4)| = \frac{5}{\sqrt{1^2 + 2^2}} = \sqrt{5} \qquad \angle H(2 \cdot 10^4) = 0 - \arctan(-5) \approx 1.37$$

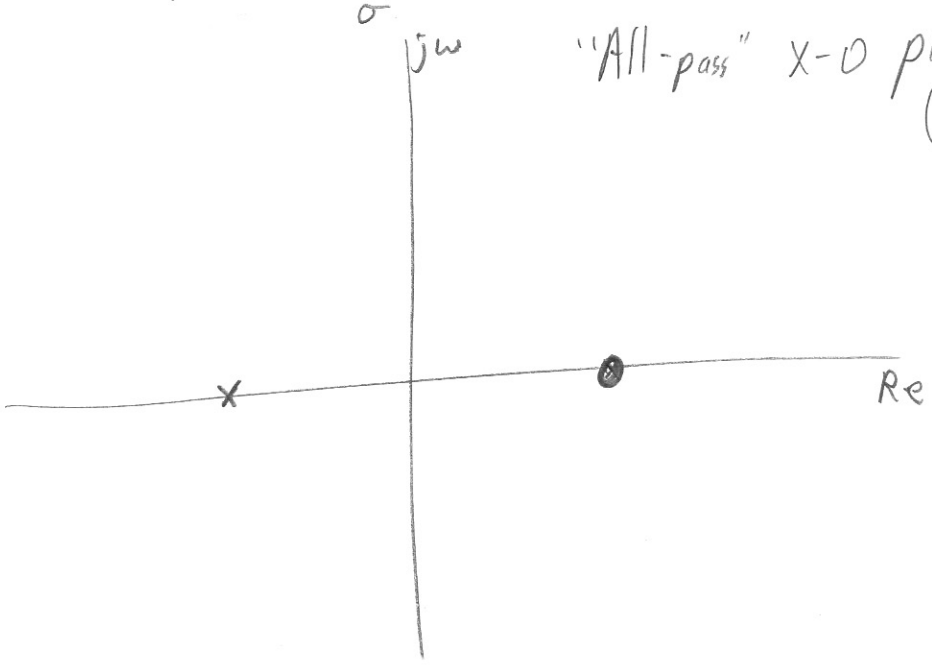
$$V_{out}(t) = 5\cos 10t + \sqrt{5}\cos(20000t + 1.37)$$

2) Write down one question/confusion from Homework 7.

Discuss Questions from Homework, Lecture

Recall: Vector Subtraction



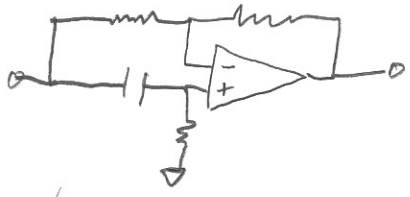


"All-pass" X-O plot

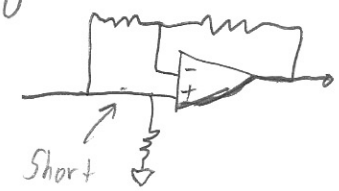
("O"s (zeroes) correspond to terms in the numerator;
"X"s (poles) correspond to terms in the denominator)

Worksheet: All-pass filter analysis.

Wrap-up: We can conceptually analyze the circuit another way...



$\omega \to \infty$, $Z_c = 0$



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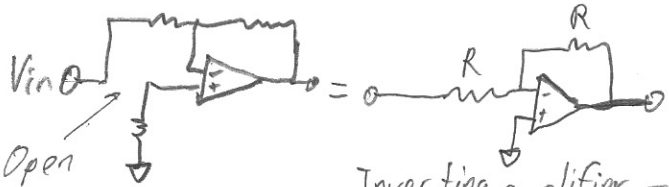
Non-inverting amp; No phase shift!

$\omega = 0$; $Z_c = \infty$



Inverting amplifier – 180° phase shift!