

## EE 311 Homework 11 Signals and Systems

Name: \_\_\_\_\_

1. Consider the continuous-time LTI system with the frequency response

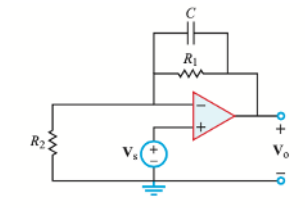
$$H(w) = \frac{a - jw}{a + jw}, \quad a > 0$$

- (a) What is the magnitude  $|H(w)|$ ?
- (b) What is the angle  $\angle(H(w))$ ?
- (c) Determine the output of the system with  $a = 1$  when the input is

$$\cos(t/\sqrt{3}) + \cos(t) + \cos(\sqrt{3}t)$$

2. For the op-amp circuit of the Figure below provide the following:

- (a) An expression for  $H(\omega) = V_o/V_s$
- (b) What type of filter is it? What is its maximum gain?



3. Determine the Fourier Transform of  $x(t)$  below

$$x(t) = \begin{cases} 3 \sin(2t) + e^{-t} & \text{for } t \geq 0 \\ 3 \sin(2t) & \text{for } t < 0 \end{cases}$$

4. A signal, bandlimited to 10 Hz, is sampled at 12 samples/s.  
What **portion** of its spectrum can still be recovered from its samples?