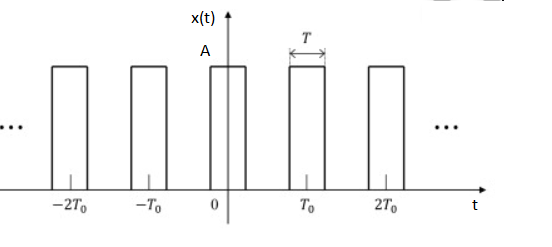
Consider the signal



a) Find the exponential Fourier series , i.e., determine such that:

b) Find the trigonometric Fourier series.



The periodic signal is given in **Figure 1**:

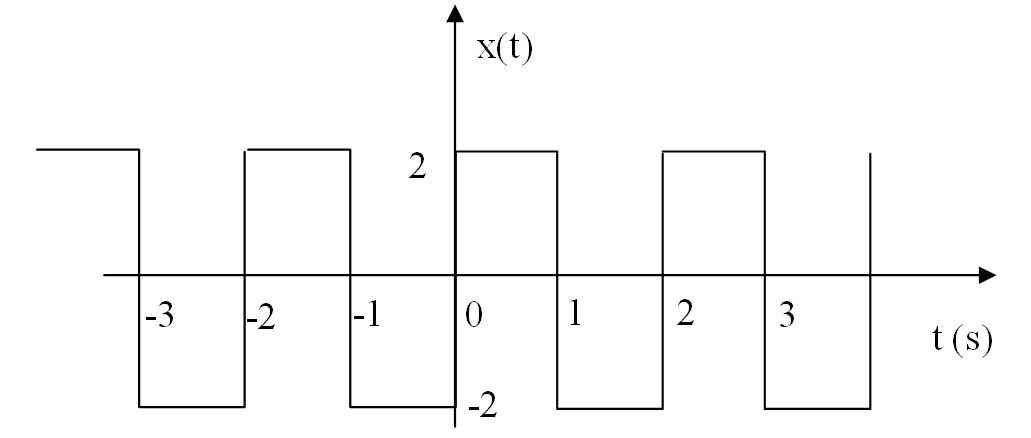


Figure 1

a) Determine the power of the signal .

b) Find the exponential Fourier coefficients of the signal .



Consider the signal

a) Sketch the signal .

b) Find the exponential Fourier series , i.e., determine such that:



a) Consider a high-pass filter with the frequency response . Determine the steady state output of the system for the input .

b) Let:

Using the definition of the Fourier transform find the Fourier transform of the signal .



a) Consider filter with the frequency response . Determine (steady-state) output of the system for the input .

b) Let:

Using the definition of the Fourier transform, find the Fourier transform of the signal .

Consider the LTI system having the unit impulse response:

a) Find the frequency response .

b) Find the response for the input signal

a) Consider the following signal:

Find and sketch the spectrum, and determine the power of signal .

b) The modulated signal is defined by

Find and sketch the spectrum , and calculate the power of.

Consider a causal LTI system with frequency response

For a particular input this system produces the output

Determine .



Consider a casual LTI system whose response (output) is for the input.

a) Find the transfer function  and the unit impulse response .

b) Find the zero-state response of the system if the input signal is

.



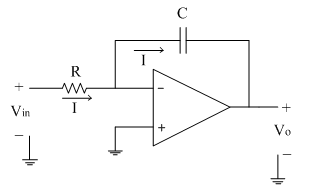
Consider the causal filter with the transfer function

a) Determine the expression of the magnitude response in dB and use the Bode plot to sketch the magnitude response.

b) Find the zero-state response of the system if the input signal is .



Consider the following circuit with .



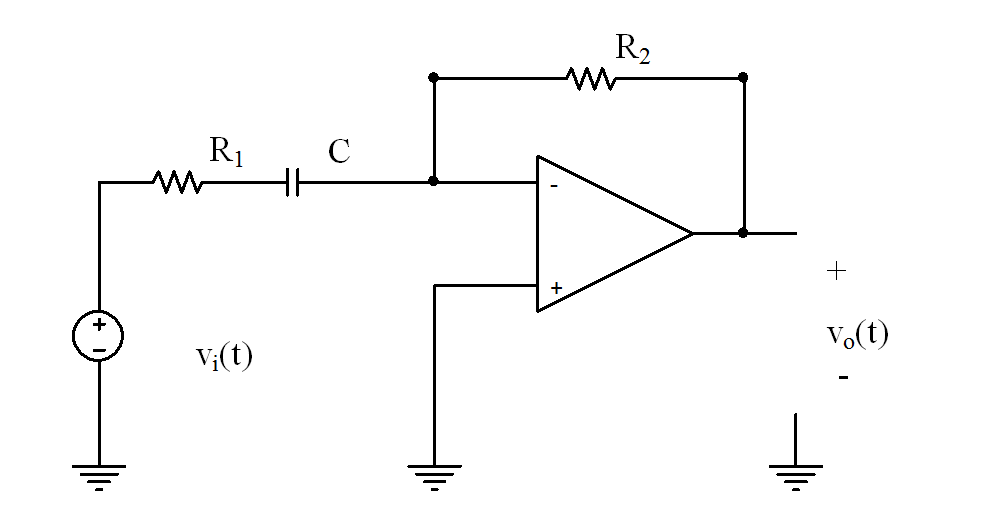
a) Find the transfer function .

b) Find the frequency response .

c) Sketch the magnitude response and phase response .

d) Find for .

In **Figure 2**, the op-amp is ideal and kΩ, kΩ, µF.



Figure

a) Find the transfer function where are the Laplace transforms of , respectively.

b) Find the frequency response and calculate the magnitude response at the given frequencies in Table below. Sketch the magnitude in dB.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (rad/s) | 1 | 10 | 100 | 1000 | 10000 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |