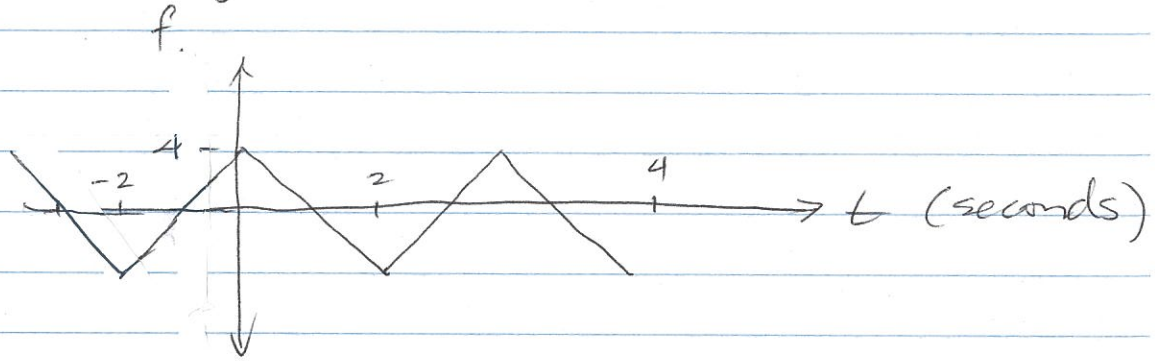
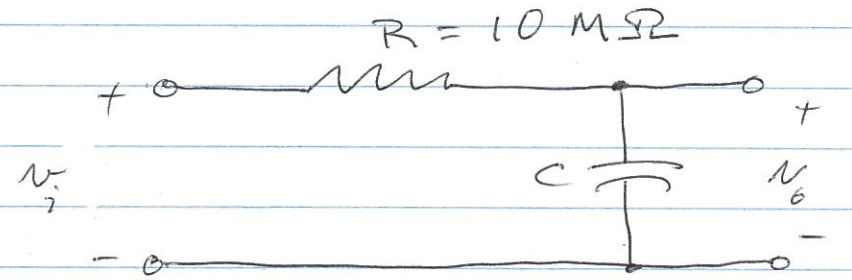
ECE 205 ASSIGNMENT #8

1. A triangle wave



is fed into the following low-pass filter



a) Choose a value for C so that the third harmonic of the output signal has a value that is 40 dB below that of the

fundamental component.

b) Write out the "classical" real sinusoidal form of the Fourier series of $f(t)$. Comment on its form.

c) Use Parseval's Theorem to find the sum of the series

$$\sum_{\substack{n=1 \\ n \text{ odd}}}^{\infty} \frac{1}{n^4}$$

d) Use the shift formula derived in assignment #7 to find the Fourier series of $f(t-1)$.

e) Find the "classical" form of the Fourier series of $f(t-1)$. Comment on its form.

2. Find the Fourier series of the following function:

$$f(t) = e^t, \quad 0 \le t < 3$$

$$f(t+3) = f(t), \quad \forall t.$$

To what value does the Fourier series converge when t is an integer multiple of 3?