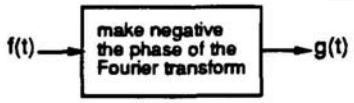
Nishimura

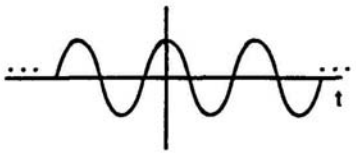
Problem 1

system

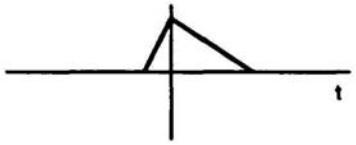


Input signal $f(t)$ and output signal $g(t)$ differ only in the phase of their Fourier transforms. The phases are the negative with respect to each other. Sketch the output for the following inputs:

a)



b)

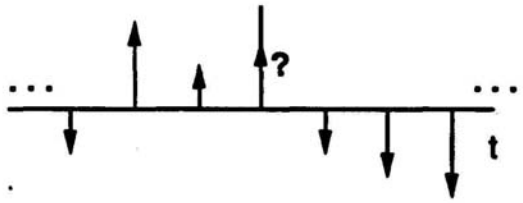


Is this system causal?

Is this system linear?

Is this system time-invariant?

Problem 2



A signal $f(t)$, bandlimited to ± 1 kHz, is sampled at the rates given below.

If the $t = 0$ sample is lost, is it possible to restore this sample point? If yes, describe how. If not possible to restore, why not?

a) Sampling rate = 5 kHz

b) Sampling rate = 2.5 kHz

c) Sampling rate = 1.25 kHz