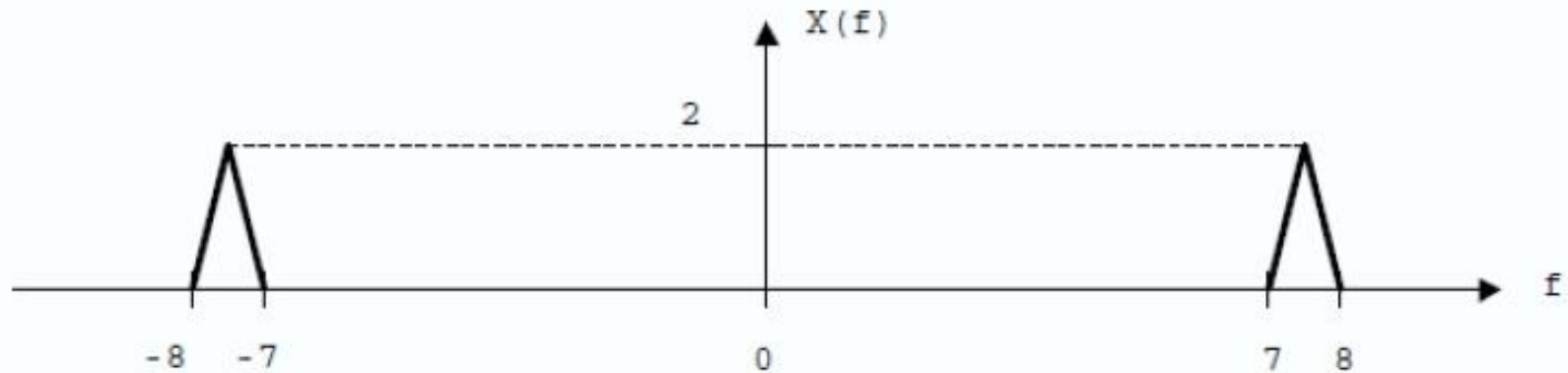


Exercise #1

Consider the bandpass signal $x(t)$ whose spectrum is shown below.



This signal is sampled at $f_s = 4$ samples/second with ideal impulses.

- Sketch the spectrum $X_\delta(f)$ of the sampled signal
- The sampled signal is now passed through an ideal *lowpass* filter (LPF) of bandwidth $W = 1$ and amplitude $1/f_s$. What is the relation between the output of the LPF and the original signal? In other words, the cascade of downsampling and low pass filtering, to which operation is equivalent?
- Sketch the spectrum of the complex envelope of the output of the LPF and write its expression in time $c(t)$.