

Question 1

A zero-mean white Gaussian WSS noise process $n_w(t)$ with the power spectral density $S_{n_w}(f) = \frac{N_0}{2}$ passes the bandpass filter shown in Fig. 1 to generate the colored noise $n(t)$.

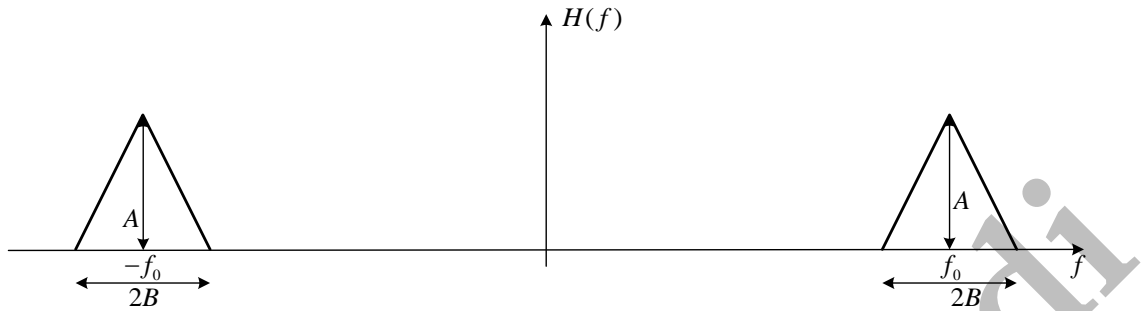


Figure 1: Triangle bandpass signal.

(a) Find the noise equivalent bandwidth of $H(f)$.

(b) Derive and draw the power spectral density and calculate the power content of the in-phase process $n_c(t)$ and quadrature process $n_s(t)$ of $n(t)$.

(c) Find the joint probability density function of $n_c(t_0)$ and $n_s(t_1)$.