Project 4

Design of equiripple FIR filter (Parks and McClelland filter):

The following specs are given: $\omega_p = 0.1$, $\omega_s = 0.15$ and $N = 2M + 1 = 21$. Design the corresponding LPF and plot the frequency response of the filter. Find the corresponding ripple of the passband.

Now change the value of N (both low and high) and repeat the experiment.

Reduce the value of ω_s (make it closer to ω_p) and observe the behavior of the designed filter.

Now generate a signal

$$x(n) = \sum_{\iota=1}^{6} b_i \cos(\omega_i n) + noise$$

with $\omega_\iota s$ distributed in all frequency band like some in $(0, \omega_p)$, some in (ω_p, ω_s) and rest in (ω_s, π). Obtain the filtered output. Repeat the experiment for different choices of $\omega_i s$ and noise level.