EE619 Quiz 2

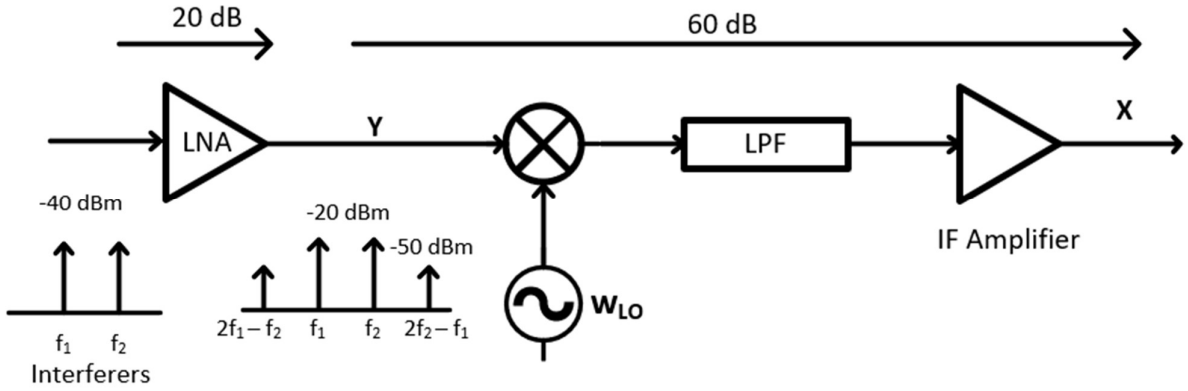
Question 1 (3 marks)

We need to design a second order BP filter with center frequency at f_c = 400 MHz. What should the Q factor of the BP filter be, so that we get an attenuation of around 83 dB w.r.t. that at f_c, at an offset of 600 kHz from f_c?

Question 2 (3 marks)

Consider a heterodyne receiver as shown below. The interferers present are as shown in the diagram below.

Power gain of LNA is 20 dB while that from Y to X is 60 dB and also assume there is no non-linearity from Y to X. Say we have a desired IF channel centered at $2f_2 - f_1$



1. What is the $IIP3$ of the LNA?
2. Show that any amplifier placed after X needs to have $IIP3$ greater than $+40$ dBm

Question 3 (4 marks)

Say for a homodyne receiver,

- Gain Error, $\epsilon = 0$
- Phase Error, $\theta = \frac{\pi}{3}$

Find the points of the constellation diagram for a QPSK modulated signal