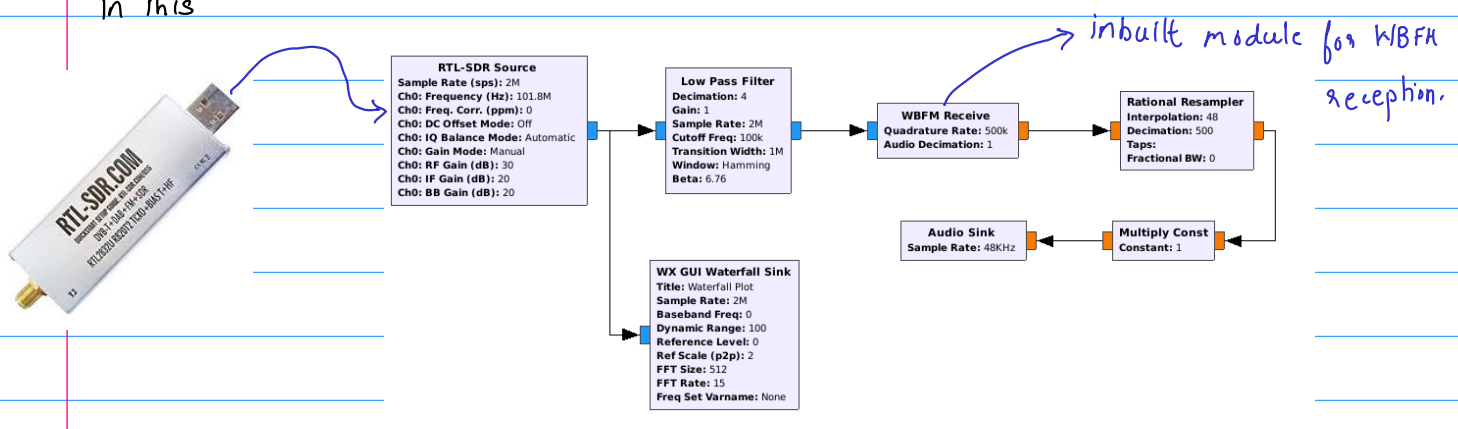
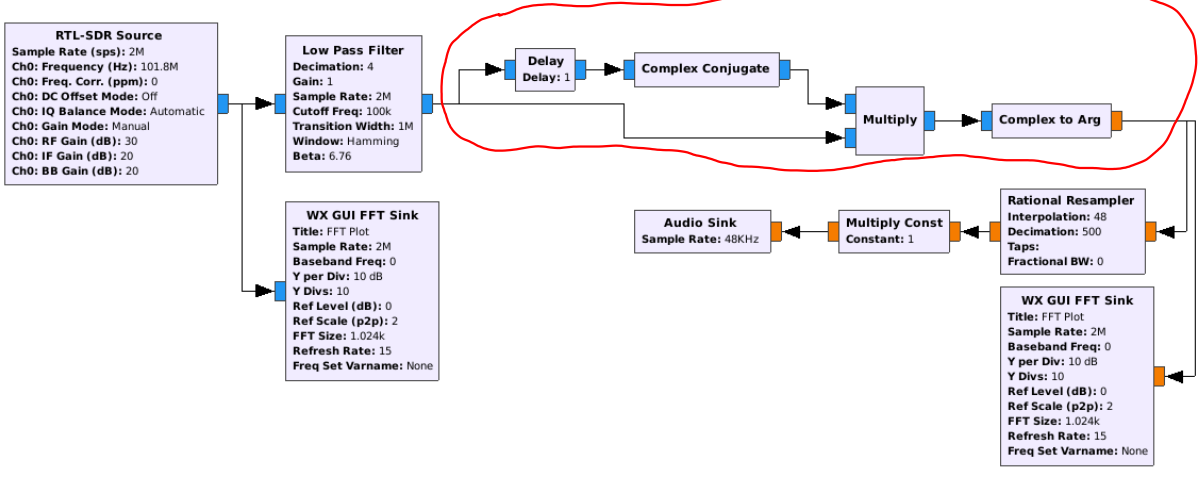
Stereo FM reception using GNU radio. (both FM and AM demodulation are involved in this




inbuilt module for WBFM reception.

The complex baseband receiver:

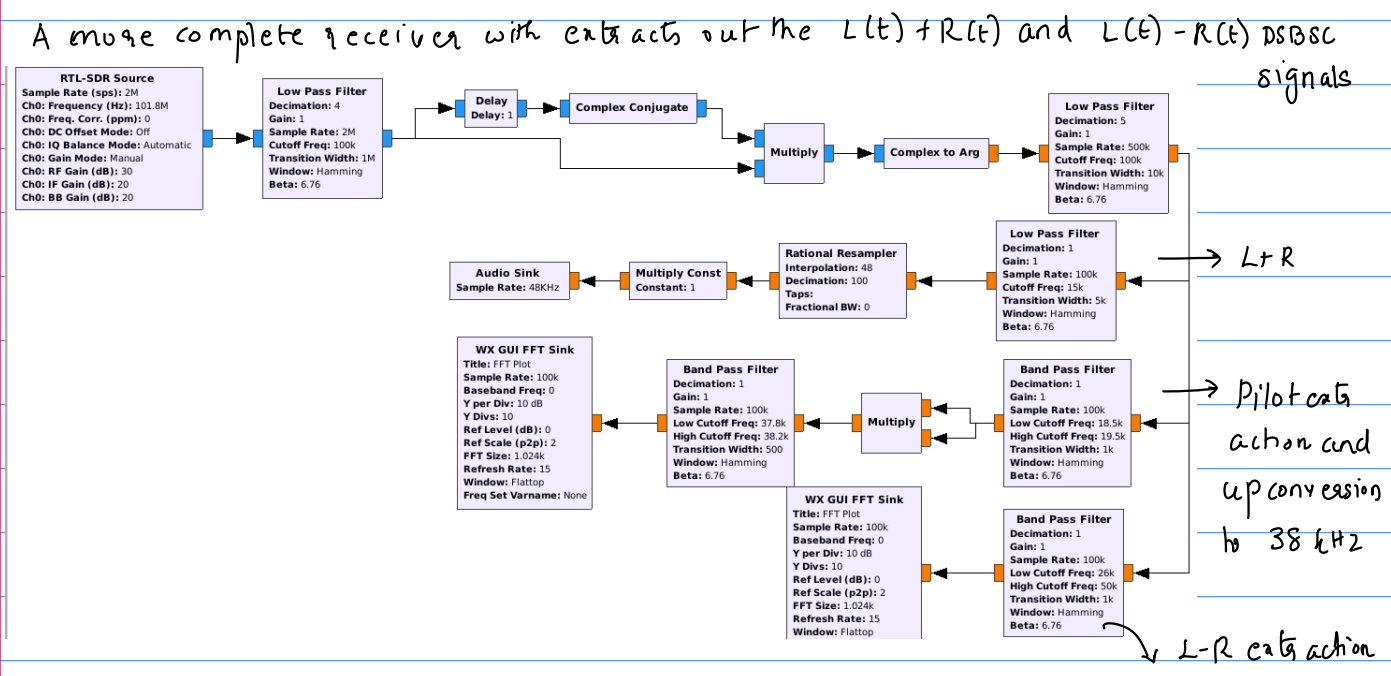



This extracts out samples of the modulating signal $m(t)$

This is FM stereo baseband signal and we are directly playing that!

Think about possible issues here and how it can be improved!

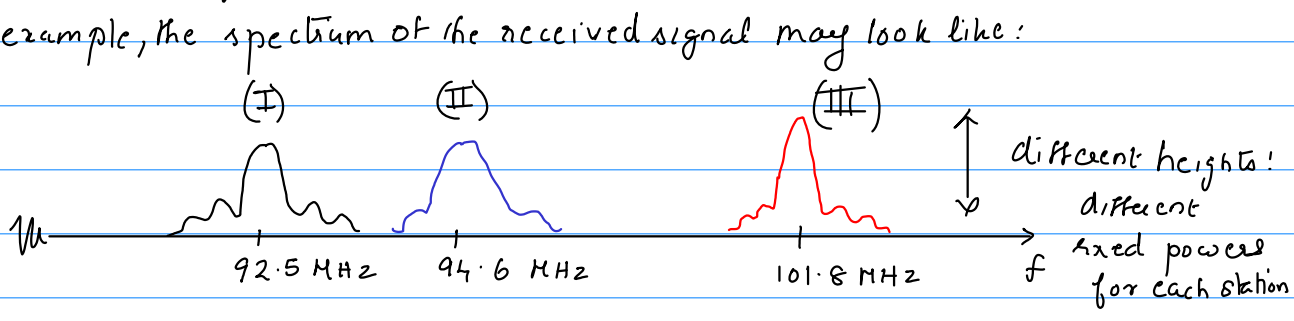
A more complete receiver with extracts out the $L(t)+R(t)$ and $L(t)-R(t)$ DSBSC signals




Additional question: Think about what needs to be done so that the left and right channel signals can be extracted out separately.

Superheterodyne receivers. (refer UM / Taub & Schilling for this).

A requirement in broadcast radio is that of listening to a channel or radio station of our choice out of a number of available stations or channels. Multiple signals (FM or AM) are transmitted at the same time using the idea of frequency division multiplexing. For example, if we are looking at our local FM stations, each station transmits an FM signal at an allotted centre freq. The station center frequencies and bandwidths are such that the signals don't overlap. For example, the spectrum of the received signal may look like:




Our receiver needs to select one of these channels - according to our choice - demodulate the signal at the selected channel. How can this be done?

Suppose we need to listen to channel (II) then a filter can be used to select the channel at (II). Note that for either AM or FM a simple receiver structure would use envelope detection - so the demodulation is carried out on a passband signal. The issue here is that this filtered signal needs to be amplified and if we are operating at the carrier frequency, then doing this amplification at RF freq. requires a high Q factor filter with a large gain - which is difficult to realise. The superheterodyne architecture helps us to address this issue.