Lab 1: GNU Radio familiarization

Task 1: Happy birthday song

- Synthesize the tune for “Happy birthday to you” on GNU Radio on repeat loop
- The piano notes for this tune are:

C,C,D,C,F,E;

C,C,D,C,G,F;

C,C,C*,A,G,F,E;

A#,A#,A,F,G,F

blocks used:

vector source: passes the array of frequency that is stored in it

repeat interpolation: convert the array into

Vco takes in input in volts(say f) and gives out sin(k*f) ll k = senstivity ….. to make a sine wave of f frequency set the sentivity to 3.14*2

Each note corresponds to a certain frequency. For example, the standard C corresponding to 262Hz. You can look up the remaining frequencies online.

Text Text

Task 2: Music synthesis

- You have been given two audio files – background.wav and vocal.wav The former contains the background score for a song, sampled at 44.1 kHz, and the latter contains the vocal component, sampled at 32kHz.

- Your task is to coherently combine the two to recreate the music clip

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Text

wav file source: give path of the file and it will output the song!!be carefull about the sampling rate of the song!! mostly followed by a rational resampler

Rational Resampler: used to change the sampling rate oof the signal
new sampling rate
= F * interpolation/decimation

Task 3: Equalization

- Build an equalizer in GNU Radio for music.
  - An equalizer allows one to tune the gain/amplification in different frequency bands: https://en.wikipedia.org/wiki/Equalization_(audio)
  - Use the following bands: 20Hz -- 500Hz, 500Hz -- 3kHz, 3kHz -- 6kHz, 6kHz -- 9kHz, 9kHz -- 15kHz

  - You should have a GUI with a slider for adjusting the gain on each band
  - Use the audio clip Bach.wav (sample rate 48kHz) to demonstrate your equalizer

band passfilter: make transition width substantial abt 0.1*cutoff

WX Gui slider

Task 4: FM player

- Use the RTL-SRD dongle to build an FM player using GNU Radio
- Your GUI should have a mechanism for choosing the FM frequency

*You are allowed to use the built-in FM demodulation block for this task