

DSPIRA GnuRadio Lessons: Introduction and Simple Spectrometer

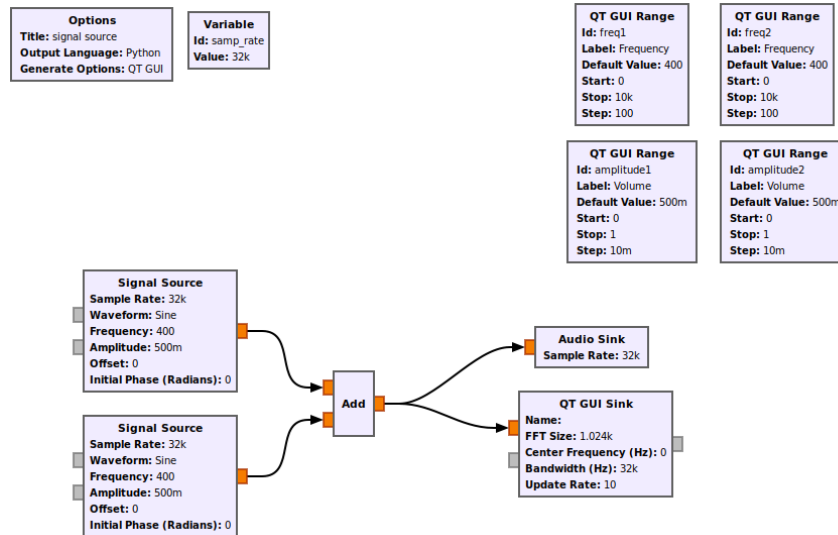
Lesson 2: Multiple Signal Sources

In this activity you will construct a program that is a signal generator comprised of multiple sine waveforms with the ability to control their amplitudes and frequencies. These are added together to create a more complex output.

Build a Two Waveform Signal Generator

- Open your signal source frequency file from Lesson 1.
- **Save as . . .** using a new file name.
- We will be working with sine waveforms. In the **signal source** block, change the **Waveform** type to "Sine".
- Also change the name of Frequency to "freq1".
- In the **QT GUI Range** block for "freq", change the **Id** to "freq1", and in the **QT GUI Range** block for "amplitude", change the **Id** to "amplitude1".
- Add a second signal source by completing the following:
 - Click on the **signal source** block and copy it (right-click Copy, or ctrl-c). Then paste it on the canvas.
Alternately, import a **signal source** block from the library on the right. Be sure to change the **Waveform** type to "Sine".
 - Copy the freq1 **QT GUI Range** block, and paste it on the canvas.
 - Copy the amplitude1 **QT GUI Range** block, and paste it on the canvas.
 - Open the copy of the **QT GUI Range** block, and change the **Id** to "freq2".
 - Then open the copy of the **signal source** block, and change the Frequency to "freq2".
 - Delete the connections from the original **signal source** block. (Highlight and hit "Delete".)
 - Add an **Add** block to the canvas. Make sure its **IO Type** is set to "float".
 - Connect both **signal source** blocks to the inputs of the **Add** block, one to each input.
 - Connect the **Add** output to the **Audio Sink** and **QT GUI Sink**.

- Your canvas should look like the following:



- Run the program.
- Explore the graphical displays and audio output when changing the frequencies and amplitudes of each input.

Build a Three Waveform Signal Generator

- Add a third signal source:
 - Repeat the steps above to add a third **signal source**. Be sure to add the appropriate frequency and amplitude variables by adding additional **QT GUI Range** blocks.
 - Change the **Num Inputs** in the **Add** block to 3.
 - Run the program and explore the output audio and the displays by the changing the frequencies and amplitudes of each input.

Build an six Waveform Signal Generator

- Add 3 more signal sources to make a signal generator comprised of 6 sine waveforms.
- We will be using this in Lessons 3 and 4.