

Tutorial – Week 5

1. Using week 4's `subpatches` for the sine, square, sawtooth, and pulse waves, create a set of sliders, one for each oscillator, to control their individual amplitude levels. (You can find a patch containing those in the Extras folder if you haven't completed last week's task)

Add the outputs of all the oscillators together to mix their signals and send to the `dac~` object. Add toggles so that you can toggle the output of any oscillator on or off.

Use one slider to control the frequency of all the oscillators, but also add an option to allow the frequency of each oscillator to be multiplied by a number (for example, and integer), thus adding the possibility of mixing waves at different harmonics.

Finally, add a master volume control (smoothing with `line~`). Try mixing the various oscillator outputs together to create new sounds.

2. Add a new subpath containing a simple FM synthesis module. You should be able to control amplitude, carrier, modulation and index through sliders, similarly to the frequency control of the previous `subpatches`.
3. Create an Low Frequency Oscillator (LFO) and use it to oscillate the simple sine's output. In what other ways could you use the LFO?
4. Using `key` (right-click and look at the help file to find out more) adjust your patch so that you can trigger notes on the FM synthesis module by pressing keys on your computer keyboard. Using `keyname` adjust it further so that these notes become audible every time a key is pressed - you shouldn't be needing the FM's volume slider after that. (The `line~` object can be of use here.)

NOW YOU HAVE A BASIC SYNTHESIZER

SIGNAL PROCESSING

5. In Week 5's Examples folder find patches for delay, multistep delay, delay feedback, comb filter and flanger. Make sure that you understand how these work.
6. Try incorporating these in PARALLEL to the synth you have created above, so that you can have WET/DRY control over how much of the synth's sound is being processed. You should be able to play the Synth using your computer keyboard, while adjusting the parameters of those effects.

If you have any questions drop me a line at c.michalakos@abertay.ac.uk