

Project #2 DSP and Synthesis

Part B *Additive & FM Synthesis*

Presentation Day: Mon., Oct. 28, 2019

All audio output should be directed to the iMac's built-in output.

*As you work, keep an informal journal of your technical/musical goals.
You will use these journal entries as the basis for the required bullet-point paper
that you must turn in with your presentation.*

1. ADDITIVE SYNTHESIS

Extend MSP **Synthesis Tutorial 1 Additive Synthesis** to play 8 *partials* instead of 6. Save your work in a patcher file named "AdditiveSynthesis.maxpat" in your private MSP folder. Create five (5) interesting *additive synthesis* sounds (i.e. *complex tones*) that have the following *partial relationships*:

1. Harmonic
2. Nearly harmonic
3. Inharmonic
4. Closely-spaced partials that produce beating
5. Whatever you want

Each partial MUST have its own independent *amplitude envelope* (using the **function** object). Each sound should have a clear "musical" goal which you will briefly describe in bullet-point fashion in your brief "paper". Use the **preset** object (locations 1-5) to store/retrieve your synthesis settings. In your paper, give each sound a descriptive name. Feel free to be creative.

2. FM SYNTHESIS

Using MSP **Synthesis Tutorial 5 Frequency Modulation**, create four (4) interesting FM timbres. Save your work in a patcher file named "FMSynthesis.maxpat" in your private MSP folder. Be sure to:

- Experiment with wildly different values for the *carrier frequency* and *harmonicity ratio* (f_m/f_c)
- Experiment with different *amplitude envelopes* and *durations*
- Change the *modulation index* over time to create dynamic *timbre* (i.e., spectrum changes over time)

Use the **preset** object (locations 1-4) to store/retrieve your synthesis settings. In your paper, give each sound a descriptive name. Feel free to be creative.

Paper

Write an informal 1-2 page paper (typed, bullet-point style) that contains descriptions of the 9 sounds you created. Briefly describe your technical/musical goals for each sound. A printed hard copy of your paper is due at your in-class presentation.

Grading

Paper - 50%; Followed instructions - 25%; Class presentation (ready to go)/creativity (the sound of it) - 25%

Programming reminders

Use Max's interactive object Help feature as you work. Use the self-commenting code where appropriate. Document your program using comments. Strive for well-organized signal networks. Use Max's Arrange menu, Segmented Patch Cords, etc. to make your program easy to read. Be sure to backup your work on a daily basis!

Updated: 10/8/2019