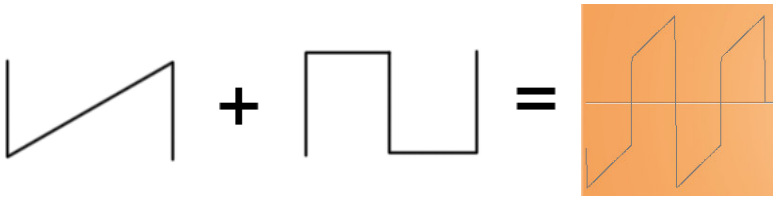
Adam's Synth Tutorial Series: Part 2

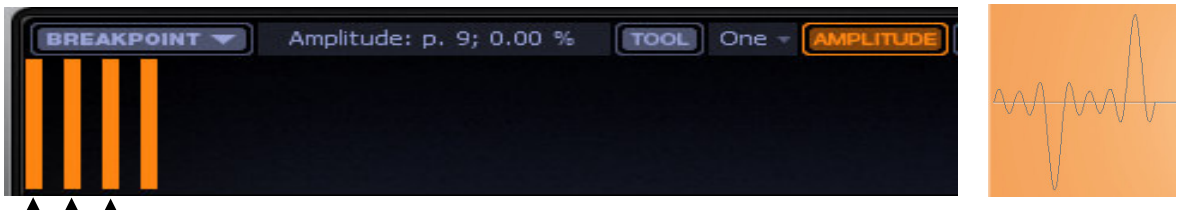
Welcome to part 2 of the tutorial series. In this part, we will look at different synthesis methods and various techniques of creating sound.
In order to sucessfully create the sound we are after, it is nescessary to understand the differences, and the functionality of various synthesizing methods, so that when we have an idea of what to create or what we want, then we would know which technique to use and when. There are many synthesis approaches, but we will look at the most common ones: Subtractive Synthesis, Additive Synthesis and Frequency Modulation.

Subtractive Synthesis:
Perhaps the most common word one will encounter when looking at virtual synthesizers is "Analogue". Of course, VSTis are not really analogue, since they are digitally executed on the computer, they do not have their own transistors, resistors or ciruits, therefore they are usually called Virtual Analogue or VA for short. They are merely emulations of older hardware gear that used analogue signal processing, instead of digital code. Even though VA synths are not Analogue, todays technology offers developers the tools to create some extremely great sounding emulations of hardware synths.
Analogue signal processing usually starts with a Saw, Square, Triangle or Sine waveform, and then passed through a filter to take away or substract harmonic content from the wave, and then lastly being modulated by a volume envelope.



Subtractive Synthesizers are the most popular because they are easy to get started with and to tweak. Although this synthesis is capable of creating sweeping pads, plucks and other sharp sounds, it is most suitable for basses and leads. Because of the saw and square waves, Subtractive synthesizers can make some very nice and low basslines, and nice and bright leads. A couple of great synths for this task are Synth1, V-Station and Zebra2 for example.

Additive Synthesis:
Every sound you hear is made up of sine waves. By adding many sines together with different phase, and amplitudes, one could virtually create any sound possible.
Additive Synthesis uses exacly this theory of generating sound. It generates a fundamental sine, and one can add additional overtones, or harmonics with different properties, and one can create some very interesting textures and evolving soundscapes.

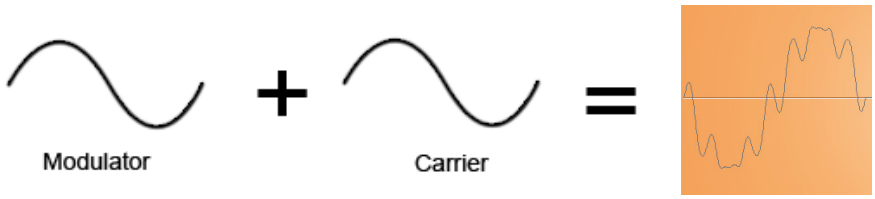


Fundamental
2nd harmonic
4th harmonic

Because of its complexity, begginers might find this synthesis a little too complicated and confusing, but for experienced users this is a great way to make interesting spacey pads, and other ambient atmospheres. Since it uses sines, once can very well emulate real life instruments, like pianos, guitars and flutes. The Morphine virtual instrument is perfectly suited for this job.

Frequency Modulation:
Frequency Modulation (or FM in short) was first used by Yamaha in the 1980s and the most popular synth that used this method was the DX7.

The way this technology works, is by taking wave generated by an oscillator called a ”carrier” waveform. Then, an other wave with a different frequency and amplitude called a ”modulator”, is applied to change or modulate, the frequency of the carrier waveform. One can of course further modulate the combination of the first two waves, to create even more complex and interesting waveforms. The higher the amplitude of the modulator, the higher the modulation effect. If one uses extreme modulation amount, one can get some distorted sound, whic is great for techy sound, and is popular in harder styles of music. If one is gentle with the modulation though, it is possible to create nice and clean bass and plucky sounds, but also sparkling and dreamy pads.



The best recreation of the Yamaha DX7, is the Native-Instruments FM7. It faithfully recreates the hardware synthesizer and even allows one to import presets from the hardware. The new update, the FM8, takes the limits even further and the possibilities are almost endless.

This concludes episode two, where we briefly took an overview of the most popular synthesizing methods, and their uses.