Episode 01

Subtractive Synth in SuperCollider



Subtractive Synth in SuperCollider

Demonstration



SuperCollider

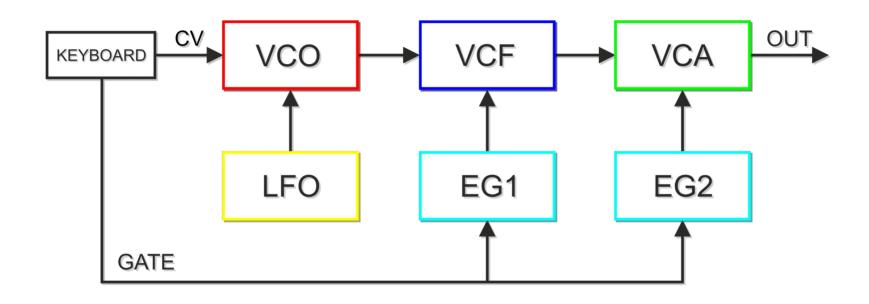
```
subtractive_synth.scd (~/Desktop/Computer-Music/supercollider_sketche) - SuperCollider IDE
 File Session Edit View Language Server Help
                                                subtractive synth scd
                                                                                                                                                                                 Table Of Contents ▼
                                                                                                                 SuperCollider Browse Search Indexes ▼
 2 Server.default.options.outDevice ("Lautsprecher (Realtek(R) Audio)");
                                                                                                                 Classes | UGens > Generators > Deterministi
 3 s.boot;
                                                                                                                                                                                                       Help-System
                                                                                                                 Saw : UGen : AbstractFunction : Object
 4)
                                                                                                                 Band limited sawtooth
                                                                                                                 Source: ESinOsc sc
 7 SynthDef(\SooperSaw, { | out, freq = 220, gate = 1, amp = 0.7, release = 1.5|
                                                                                                                 See also: SyncSaw, VarSaw, LFSaw
                                                                                                                 Description
                                                                                                                 Band limited sawtooth wave generator
       //var sig = Saw.ar(freg, mul: 1.0, add: 0.0);
                                                                                                                 Class Methods
       var sig = Saw.ar([freq, freq*1.01], mul: 1.0, add: 0.0);
       var env = Env.adsr(0.02, 0.1, 0.7, release, 1.0,-4.0);
                                                                                                                 Saw.ar(freq: 440.0, mul: 1.0, add: 0.0)
       var gen = EnvGen.kr(env, gate, doneAction: Done.freeSelf);
                                                                                                                      freq Frequency in Hertz.
       var filtered = BLowPass.ar(
                                                                                                                      mul Output will be multiplied by this value.
                                                                                                                       add This value will be added to the output
            MouseX.kr(10, 20000, \exponential), // cutoff freq.
            MouseY.kr(4.0, 0.0, \linear), // rq
                                                                                                                 Inherited class methods
                                                                                                                 7 methods from IIGen be show
                                                                                                                 8 methods from Object ▶ show
       Out.ar(out!2, filtered * gen * amp)
                                                                                                                 Undocumented class methods
29 a = Synth(\SooperSaw,[\freq, 110]);
                                                                                                                localhost: keeping clientID (0) as confirmed by server process.
30 a.set(\gate, 0);
                                                                                                                Shared memory server interface initialized
                                                                                                                                                                                                                   Output
                                                                                                                -> Synth('SooperSaw': 1000)
                                                                                                                server 'localhost' already running
                                                                                                                -> a SynthDef
                                                                                                                -> Synth('SooperSaw': 1004)
```

Editor



https://en.wikipedia.org/wiki/SuperCollider

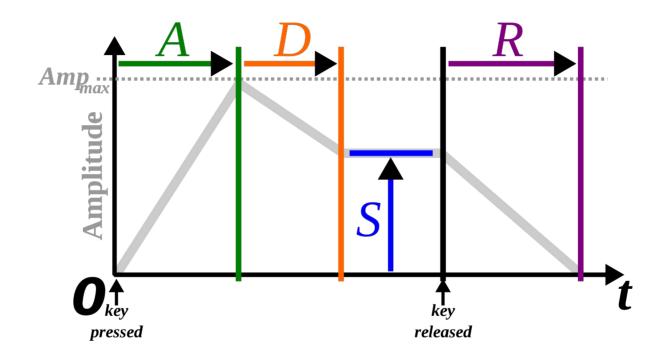
Subtractive Synth: Base



https://en.wikipedia.org/wiki/Synthesizer#Theory



Subtractive Synth: Envelope Generator





https://de.wikipedia.org/wiki/ADSR

Conclusions

- Oscillators generate a continuous cyclic signal
 - the signal (should) contain harmonics/partials
- Filters control the frequencies of a signal
 - if resonant, the filter emphasizes frequencies (e.g. cutoff)
- Envelope Generators can be used to control parameters of other modules



Final Thoughts

- SuperCollider is a powerful computer music system
 - it needs some experience, though
- Creating a simple subtractive synth in SuperCollider is straightforward and simple
- Turning it into a versatile musical instrument requires some design and thinking

