// John Chowning's single carrier FM sounds from his first paper //

// Load each individual synth to use them //

// Audition each sound at the bottom of the page //

(

SynthDef(\fm\_brass, {

 arg freq = 440, cmRatio = 2, index1 = 0, index2 = 5,index3 = 3, indexe = 0.5, attack = 0.01, sustain = 0.8, release = 0.4, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_woodwind, {

 arg freq = 440, cmRatio = 0.3, index1 = 0, index2 = 2,index3 = 2, indexe = 0.5, attack = 0.01, sustain = 0.3, release = 0.1, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_bassoon, {

 arg freq = 440, cmRatio = 0.2, index1 = 0, index2 = 1.5, index3 = 2, indexe = 0.5, attack = 0.01, sustain = 0.9, release = 0.1, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_clarinet, {

 arg freq = 440, cmRatio = 0.6, index1 = 4, index2 = 2,index3 = 2, indexe = 0.5, attack = 0.01, sustain = 0.3, release = 0.1, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_bell, {

 arg freq = 200, cmRatio = 1.4, index1 = 0, index2 = 10,index3 = 16, indexe = 15, attack = 0.01, sustain = 15, release = 1, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_drum, {

 arg freq = 200, cmRatio = 1.4, index1 = 0, index2 = 2, index3 = 0.19, indexe = 0.2, attack = 0.05, sustain = 0.1, release = 0.1, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

(

SynthDef(\fm\_woodrum, {

 arg freq = 80, cmRatio = 0.75, index1 = 0, index2 = 25,index3 = 25, indexe = 2.1, attack = 0.01, sustain = 0.1, release = 0.05, level = 0.5, pan = 0;

 var modFreq = freq/cmRatio, index = Line.kr(index1, index2,index3, indexe, doneAction:2) ;

 Out.ar(0,Pan2.ar(SinOsc.ar(SinOsc.ar(modFreq,0,modFreq\*index,freq),

 0,Env.linen(attack, sustain, release, level).kr(2))

 , pan))}).add;

)

// Example of how to use these sounds //

(

t = TempoClock(80/60);

Pbind(

 \instrument, "fm\_clarinet",

 \degree, Pshuf([2, -7, 6, 5, 4, 8, -3, -4] -1, inf),

 \dur, Pseq([0.25, 0.25, 0.5], inf)

).play(t);

)

// Run Code with Shift + Enter //

// Use the object Synth and the name of a SynthDef to audition a sound - just run each line!//

Synth(\fm\_brass);

Synth(\fm\_woodwind);

Synth(\fm\_bassoon);

Synth(\fm\_clarinet);

Synth(\fm\_bell);

Synth(\fm\_drum);

Synth(\fm\_woodrum);