Composition: Electronic Media II Spring 2009 Spectral Synthesis in Kyma Part 1

- 1. To play a spectral file, use the SumOfSines prototype. This module allows you to:
 - a. Open up to 2 spectral files in the same module.
 - b. Change the frequency of one or both of them.
 - c. Change the playback speed of one or both of them
 - d. Move through the spectral snapshots of one or both of them.
 - e. Perform such cross-synthesis techniques as morphing.
- 2. Launch Kyma and close all of the windows except Status and Prototypes, as shown below:

			riototypes				
Additive synthesis Aggregate Synthesis Compression/Expansion Cross synthesis Delays-Mono Disk-Mono Disk-mine & Menchenine	Resynthesis + Vibrato KBD	ResynthRandom Frames	SawSquare Additive LITE	ShepardGlissando	SumOfSines	SumOfSines Resynthesis KBD	Swarm
Distortion & wavesnaping	4 (() + (
No Sound loaded.							

- 3. Create a new Sound file as follows:
 - a. Select File>New. A window like the one below will appear:

Please choose a file type to create:			
Sound file 👻			
New Cancel			

b. Select Sound file and click on New. A window like the one below will appear. This window is a Sound file and behaves somewhat like a folder, as will be discussed in class.



- 4. Place a Sum of Sines prototype into the Sound file as follows:
- a. Scroll through the Categories window on the left and select Additive synthesis, as shown below:



b. Scroll through the Prototypes window on the right and select SumOfSines, as shown below:



Prototypes

c. Drag and drop SumOfSines from the Prototypes window onto the Sound file, as shown below



5. To edit the SumOfSines module (formerly a Prototype, now a Sound in Kyma terminology), double-click on the SumOfSines module. An edit window like the one below will appear:

				SumOfSines		
						× (
			51	Imotsines		
4)+
Frequency0		Frequency1		OnDuration		
default hz * (2.0 ** (<mark>!Interval</mark>	/ 12.0))	0 hz		4 s * (2 – <u>!Rate</u>)		
Analysis0		Analysis1		DBMorph	PchMorph	
bali1 s256		bali1 s256		0	0	
Gate E	nvelope			LoopStart	LoopEnd	
1	1		⊠Loop	lStart	!Start + !Length	
NbrPartials B	BankSize			TimeIndex		
128 0	default		CtrlTime	!Index * 2 – 1		
						SumOtSines

6. For a description of the functions of this, or any, Sound, go to Info>Describe Sound. A window like the one below will appear:



- 7. Looking at the screen shot shown below, consider the following:
 - a. Analysis0 has a disk icon that opens any spectral file created in Kyma.
 - b. Analysis1 has a disk icon that opens any spectral file created in Kyma.
 - c. The frequency of Analysis0 is controlled in the window labeled Frequency0.
 - d. The frequency of Analysis1 is controlled in the window labeled Frequency1.
 - e. In the spectral domain, frequency is independent of speed of playback.
 - f. The frequency can be controlled by a slider, as shown in Frequency0 or by typing in a specific value, as shown in Frequency1. A value of 0 hz will play the default or base frequency of the file.

Frequency0	Frequency1
default hz * (2.0 ** (!Interval / 12.0))	0 hz
Analysis0	Analysis1
bali1 s256	bali1 s256

- 8. Looking at the screen shot shown below, consider the following:
 - a. Gate will trigger playback when the number is greater than 0. We will later use a special trigger controller for this.
 - b. Envelope will control loudness. The word "envelope" is equivalent to "volume" in Kyma terminology.
 - c. NbrPartials determines how many partials or harmonics will sound during playback. If processing speed becomes an issue, this number can be reduced.
 - d. BankSize should stay at default, unless you are an advanced user and need to control processing speed.

Gate	Envelope	
1	1	
NbrPartials	BankSize	
128	default	

- 9. Looking at the screen shots below, consider the following:
 - a. OnDuration sets the amount of time in which the sound plays back. A small value means the sound will fit into a small playback window, this playing faster. A large value means the sound will fit into a large playback window, thus playing slower. In the spectral domain, speed is independent of frequency or pitch.
 - b. When the Loop box is checked, playback will be looped and LoopStart and LoopEnd will be active.
 - c. LoopStart controls where in the spectral file playback begins within an "index" range of 0 to 1, where 0 is the beginning of the file and 1 is the end.
 - d. LoopEnd controls where in the spectral file playback ends within an "index" range of 0 to 1.
 - e. When the CtrlTime box is checked, playback will be controlled by TimeIndex.
 - f. TimeIndex lets the user manually or automatically select any position in the spectral file and hold it until moved to another position. Think of the analysis as a series of snapshots. The TimeIndex lets you navigate through these snapshots.

OnDuration 4 s * (2 - !Rate)

	LoopStart	LoopEnd
🛛 Loop	!Start	IStart + ILength
	TimeIndex	
CtrlTime	!!ndex * 2 – 1	
		SumOfSines

10. Looking at the screen shot below, consider the following:

- a. DBMorph specifies how much of the amplitude (hence "DB" for decibels) envelopes of each of the envelopes is present in the resynthesized sound. A value of zero specifies that the amplitude envelopes come from Analysis0 only, a value of one specifies Analysis1 only, and values between specify mixtures of the two analyses.
- b. PchMorph specifies how much of the frequency envelopes of each of the envelopes is present in the resynthesized sound. A value of zero specifies that the frequency (hence "Pch" for pitch) envelopes come from Analysis0 only, a value of one specifies Analysis1 only, and values between specify mixtures of the two analyses.

DBMorph	PchMorph
0	0