

**Electronic Media II  
Spring 2003**

**Kyma: Spectral Analysis Tool and Morphing in Sum of Sines**

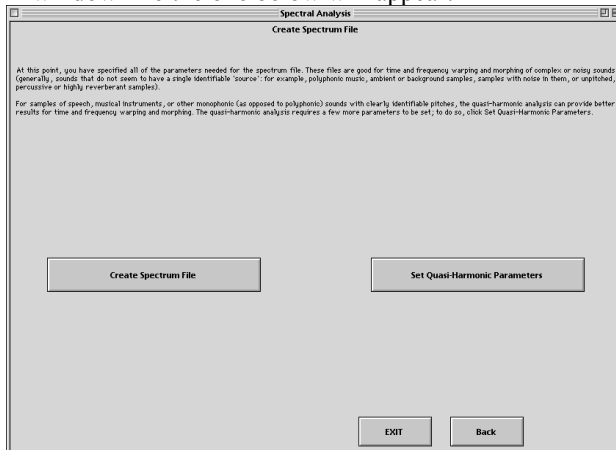
- 1) Background information:
  - a) Any audio sound can be analyzed into a set of discrete sine waves of time-varying frequency and amplitude.
  - b) After a sound has been analyzed, it is called an “analysis file,” “spectral file,” or “spectrum file.”
  - c) Analysis files are useful in computer music because individual frequencies and amplitudes of an audio sound can be manipulated and combined with components of other analysis files.
- 2) In Kyma, we will use the following tools and prototypes:
  - a) the **Spectral Analysis Tool** is used to analyze audio sounds into **Analysis files**.
  - b) the **Sum of Sines prototype** is used to manipulate the frequency and amplitude components of an analysis file.
  - c) The **Sum of Sines prototype** is also used to **morph** between two analysis files to create cross-synthesis effects.
- 3) Prepare to create an **analysis file** as follows:
  - a) Have available short, non-complex mono aiff files to analyze.
  - b) Launch Kyma as discussed in class.
  - c) Close all windows except **prototypes** and **status**.
- 4) Create an **analysis file** as follows:
  - a) Select from the menu **Tools>Spectral Analysis**. A window like the one below will appear:



- b) Follow the instructions, select an aiff mono sound file to analyze, then click on “Next.” A window like the one below will appear:



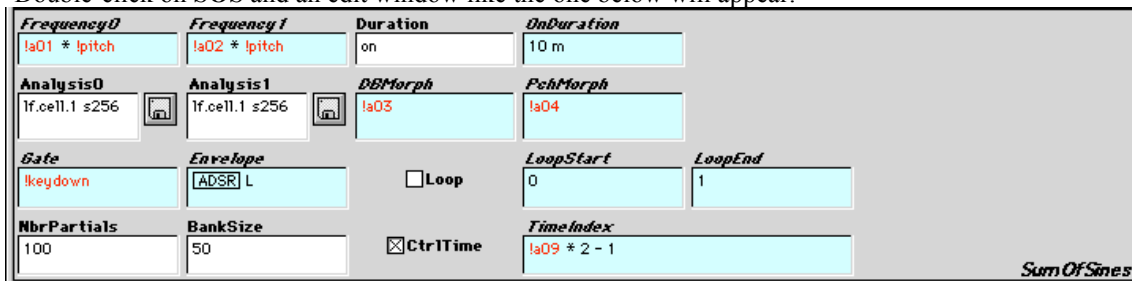
- b) Click on “Audition” then follow the instructions and experiment with the frequency and time settings. Click on “Next.” A window like the one below will appear:



- c) Select “Create Spectrum File.”  
 d) Ignore and close any windows that may appear.  
 e) To create more **Spectrum files**, use the back button to repeat the process described above.  
 f) When finished creating **Spectrum files**, click on “Exit.”

- 5) Create a **Sum of Sines** Sound as follows:

- a) Select **File>New>Sound File>New**.  
 b) Find **Sum of Sines** in the **prototypes window** and drag it to the **sound file window**.  
 c) Double-click on **SOS** and an edit window like the one below will appear:



- 6) Change the parameter fields as follows:

- a) *Frequency0*: !F0 \* 800 hz  
 b) *Frequency1*: !F1 \* 800 hz  
 c) *Duration*: on  
 d) *OnDuration*: !Dur \* 15 s  
 e) *Analysis0*: your first **spectrum file**  
 f) *Analysis1*: your second **spectrum file**  
 g) *DBMorph*: !DB  
 h) *PchMorph*: !Pch  
 i) *Gate*: !keydown  
 j) *Envelope*: 1  
 k) *Loop*: unchecked  
 l) *NbrPartials*: 60  
 m) *BankSize*: 50  
 n) *CtrlTime*: unchecked

- 7) Compile (spacebar) and notice the following actions on the **virtual control surface**:

- a) !F0 changes the frequency of Analysis0 between 0-800 hz.  
 b) !F1 changes the frequency of Analysis1 between 0-800 hz.  
 c) !Dur changes the duration of Analysis0 and Analysis1 between 0-15 seconds.  
 d) !DB changes the amplitudes of Analysis0 and Analysis1 between 0-1 (0 is Analysis0 and 1 is Analysis1).  
 e) !Pch changes the frequencies of Analysis0 and Analysis1 between 0-1 (0 is Analysis0 and 1 is Analysis1).  
 f) The *Gate*, which starts the playback, is controlled from the **Fatar keyboard**.