

Basic Synthesis

& wavetables

Additive Synthesis

- Combining samples by adding: mathematically, they just add together!
- Aurally, you hear them both at the same time!
- Physically, this is called superposition

Support of Additive

- $+~$ (is the same as running two signals into the same inlet)
- Controlling Gain: $\text{clip}~$, $\text{normalize}~$, $*~$
- Envelopes... (ADSR) $*~$, $\text{line}~$, function

Uses

- Mixing
- Amplitude Modulation
- Ring Modulation
- Everything.

Patch Time

- buffer~ playback with play~
- line~ for playback
- phasor~ to playback
- Scale and offset
- Modulate with cycle~

Sonic Break

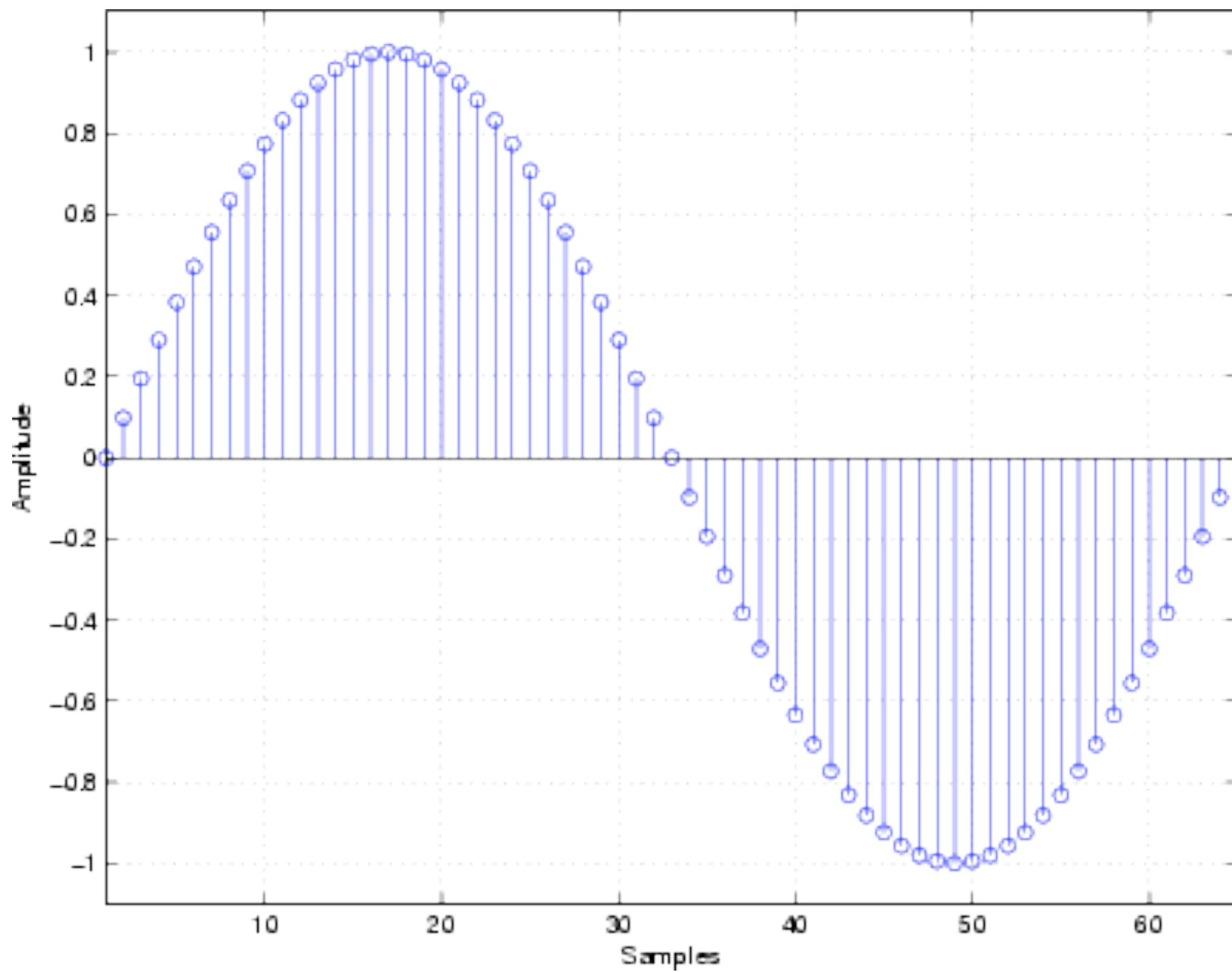
- Luke Dubois

Wavetables

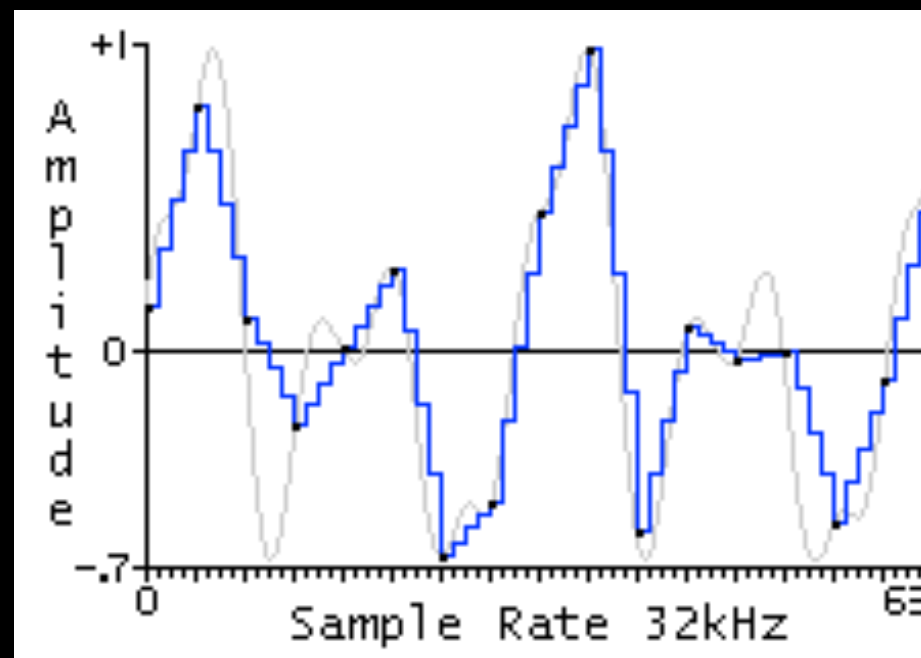
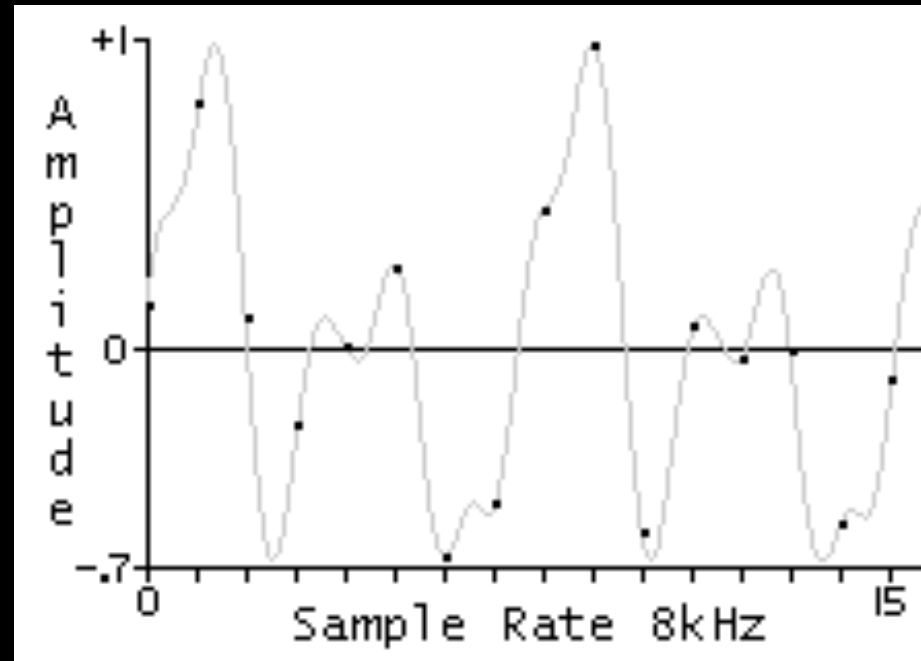
- Originally 1 cycle of a wave
- Read back at different rates for different frequencies.



- Pitch determined by number of cycles in the buffer, samples and how fast it is being read back.
- Table Pointer = Phase accumulator
- $f = \text{sample rate} / \text{length of samples}$
- $\text{phase increment} = \text{Length of Samples} * \text{frequency} * \text{Sample Period}$
- Rate of playback = frequency in Hz (e.g. cycles per second)



- Interpolation



Assignment

- Create an actual wavetable: 1 cycle of a wave
- Use the wave~ object to play it back.
- Use the *~, line~, and function objects to create an envelop for applying to the speed of the playback and another for the amplitude of the entire sound.
- Create a selection of waveforms for the synth.
- Annotate the patch with Comments

Continued

- Read MSP Tutorials 1-7, 12 & 15.
- Create an additive synth using:
 - `cycle~`, `phasor~`, `rect~`, `tri~`, or `saw~`
 - `*~`, `line~`, and function objects for changing things over time
- Trigger it through some random or table based process. Can you make it musical?