Demo 11: Blocking and AM Exercises

DSP Lab (EE 4163 / EL 6183)

Fall 2017

1 Demo files

`wavefile_AM_noblocking.py`
`wavefile_AM_blocking.py`
`wavefile_AM_blocking_savewave.py`
`wavefile_AM_blocking_fix.py`
`wavefile_AM_blocking_fix_savewave.py`
`mic_AM_mono.py`

The demo program `wavefile_AM_noblocking.py` applies amplitude modulation (AM) to a signal obtained from a wave file. This moves the signal to higher frequencies and changes the way the signal sounds.

The usual practice is to read and write of samples to and from audio devices in *blocks* rather than one sample at a time. The demo programs include a program that reads the input signal from the microphone. When reading the input signal from the microphone it is recommended that headphones be used to avoid feedback problems (sound passing from the speaker back into the microphone).

2 Exercises

1. Write a Python program to implement audio AM with a stereo output, where where different vibrato parameters (modulation frequency and amplitude) is used for the left and right channels. The output stereo signal should be saved to a wave file. Listen to the output using headphones. Submit your wave file as part of your work. SUBMIT

   The following exercises refer to the vibrato effect and the corresponding demo programs.

2. The demo program `play_vibrato_interpolation.py` does not use blocking (it reads and writes a single frame at a time). Write a version of this program that reads, processes, and writes the audio signal in blocks of 64 frames. SUBMIT

3. Modify the demo program `play_vibrato_interpolation.py` so that it reads and writes the audio signal in blocks (as in previous exercise), and takes the input signal from the microphone instead of a wave file.

4. Modify the demo program `play_vibrato_interpolation.py` so that it reads and writes the audio signal in blocks (as in previous exercise), takes the input signal from the microphone instead of a wave file (as in previous exercise), and produces a stereo output audio signal. The left and right channels of the output signal should have different vibrato parameters (frequency and amplitude).