UNIVERSITY OF MIAMI
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Engineering Acoustics EEN502/MMI361

Project No. 3

1. Speak your name (first and last) continuously and create a digital version of it using sampling rate of fs = 16 kHz and 16 bit linear quantization. In a single figure window:
   a. Plot the time waveform.
   b. Plot the wideband spectrogram.
   c. Plot the narrowband spectrogram.
   d. Select two different 30 ms vowel segments in the recorded utterance and plot their magnitude (dB vs. Hz) and phase spectra (radius vs. Hz) spectra, from 0 Hz to $fs/2$ Hz.

2. In this part you will experiment with equal loudness ideas.
   a. Generate a 5 sec chirp consisting of a tone swept from 20 Hz to 20 kHz at constant rate and constant amplitude. Assume an SPL of 20 to 50 dB.
   b. Plot the envelope required to maintain constant loudness level for this chirp.
   c. Generate the equal loudness version of this chirp.

Submit a web presentation that includes all plots your methodology, code, plots and the audio samples of your results. Summarize your results and conclusions.

Bonus Part:

Write a Matlab program which would guide through a procedure for determining the listener's standard critical bands. You may use one of the five procedures outlined in Zwicker & Fastl section 6.1. Start with the assumption that one of the critical bands is centered at 1000 Hz.

Date due: 12/04/2009