6.182 Psychoacoustics Project Laboratory

Objectives

Develop the ability to design, conduct, and analyze experiments based on:
Models of psychoacoustic measurements, including
   objective and subjective procedures
   fixed and adaptive procedures
Listening and teamwork skills required to carry out psychoacoustic measurements.
Estimating the number of trials required to test hypotheses.
Statistical analysis of the results of experimental measurements.

Develop an understanding of basic auditory function
   Absolute and masked detection
   Differential sensitivity for amplitude and frequency
   Non-simultaneous masking and pulsation thresholds
   Loudness and Pitch
   Binaural hearing
   Basic Auditory Physiology

Develop skills to present, orally and in writing, both proposals for and the results of experiments.

Outcomes

In support of these objectives, students will do the following

   Conduct and analyze an experiment measuring the masked auditory detection of tones that contrasts four protocols for estimating masked detection thresholds:
      1) The Method of Limits
      2) The Levitt Up-Down Adaptive Method
      3) The Method of Constant Stimuli
      4) The Variation of Feedback Method.

   Develop software for conducting an adaptive experiment measuring differential thresholds, conduct the experiment, analyze the results statistically, and prepare the results for publication.

   Propose, design, prepare, conduct, analyze, and prepare for publication an original psychoacoustic experiment.
End-of-Term Student Evaluation of Objectives and Outcomes

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Please rate 1-5 for each item below how well each objective or outcome was met for you. If your personal choice largely controlled the indicated outcome, please check the relevant box with + or -; for example, if you chose to skip a topic (-), or chose to work extra hard (+), personal choice was involved. The ratings mean:

1 - poorly   (F)
2 - fairly    (D)
3 - satisfactorily  (C)
4 - well     (B)
5 - extremely well (A)

Objectives -- Students will:

1) Understand the major ideas of psychoacoustical experiments:
   - Difference between subjective and objective experiments  ___
   - Difference between fixed level and adaptive experiments  ___
   - Value of using two-alternative forced-choice procedures  ___
   - Variability and statistics of measurement  ___
   - Application of Gaussian models in psychoacoustics  ___
   - Photon behavior  ___

2) Understand the major concepts of auditory function:
   - Absolute thresholds for tones          ___
   - Variability of thresholds and the microaudiogram  ___
   - Simultaneous and non-simultaneous masking of tones  ___
   - Resolution for intensity and frequency  ___
   - Loudness  ___
   - Pitch  ___
   - Relevant Auditory physiology  ___

Outcomes

Students will propose, execute, analyze, and report the results of a psychoacoustic experiment including:

1) Formulation of hypothesis to be tested  ___
2) Presentation of relevant background  ___
3) Statement of the method that to be used to test the hypothesis  ___
4) A list of the tests to be performed and the measurements to be made in each experiment  ___
5) Estimation of the number of trials required to obtain data  ___
6) A description of the results to be analyzed  ___
7) Estimating of the times to be spent on the various components of the project  ___
8) Oral presentation of the proposed measurements  ___
9) Analysis of results including statistical tests  ___
10) Oral presentation of the results of measurement  ___
11) Written presentation of the results of measurement  ___