

BSc Audiology & MSc Audiological Science

AUDL 4007: Auditory Perception

Laboratory session on notch noise masking

Introduction

A popular way to estimate auditory filter shapes is based on the technique of notch noise masking. Here, the threshold of a sinusoidal probe tone is determined for a number of flat-spectrum noises that differ only in the width and position of a spectral notch. In this lab, you will measure your threshold for a 2 kHz sinusoid for 3 different notch conditions. One of these is a no-notch condition, hence a band of noise spanning 400-3600 Hz. The two others all have symmetric notches:

Condition	g	low band edge	low notch edge	high notch edge	high band edge	threshold (SNR dB)
<i>no notch</i>	0.00	400	-	-	3600	
	0.15	400	1700	2300	3600	
	0.30	400	1400	2600	3600	

Method

You will be using an adaptive technique in a three-interval, three-alternative forced-choice (3I-3AFC) format as implemented in a computer program known as *SHaPS*. The tone will be easy to hear at the beginning of the test, and its level will be modified in accordance with how well you are doing in detecting it. Once you have started *SHaPS*, right click the mouse and select *Session* to get started. Enter your details and select a notch condition by choosing one of the following specification files: Notch0.txt, Notch15.txt or Notch3.txt. The digits indicate the g value of the particular notch condition (0.0, 0.15 and 0.3). More detailed instructions can be found over the page.

Observations

Run yourself on all 3 conditions in whatever order you like. You will then use a special program called *Rshell* to inspect the results. Again, right click to start *Rshell*. After you do the analysis, this will show you both the adaptive track as well as summary statistics. Your threshold will be found at the bottom of the page (the column labelled *uRevs*) and in the figure of the adaptive track (mean level). Enter this number in the appropriate place in the table above. Plot your SNR as a function of g , the normalised notch width:

$$g = |(f - f_c)|/f_c$$

where f is the frequency of the notch edge, and f_c is the frequency of the probe, or the centre frequency of the filter being measured.

Look carefully at the adaptive track to see if you can figure out what it is showing.

Your results files can be independently accessed in the lab folder. Once you have done all 3 conditions once, do further tests in the no-notch condition until you have 3 sets of results with thresholds reasonably similar to one another (within 5 steps). Email those results files to yourself (2 for each test), as you will need them in a future lab session.

Commands for using SHaPS

1. Start SHaPS
2. Right click mouse → Session
3. Enter a name and code. Ensure there are no spaces in the code
4. Pick a notch condition by selecting an appropriate text file
5. On the display of stimulus parameters: Options → Confirm
6. Run the test(s)
7. For the analyses: Right click mouse → RShell
8. Right click mouse → Choose a script
navigate to the directory:
C:\Users\B07_Lab\Documents\AUDL4007 notched-noise*.R
9. Right click mouse → Choose one or more data files
navigate to the directory:
C:\Users\B07_Lab\Documents\AUDL4007 notched-noise\Results\YourCode