

# **SOUND EXAMPLES**

## Chapter 1: Introduction

## Chapter 2: Acoustics and Psychoacoustics

- 1 A sine wave presented at 100 Hz, 1,000 Hz. and 10,000 Hz. It is presented twice  
to do
- 2 A 200 Hz complex harmonic tone is played. The tone has 20 harmonics  
The first 10 are cancelled and restored, one after the other IPO I.1  
.A complex inharmonic sound is played.  
White noise
- 3 The Decibel Scale: Broadband noise is reduced in 10 steps of 6 dB, 15 steps of 3 dB and 20 steps of 1 dB. Demonstrations are repeated once  
to do
- 4 Amplitude Envelope: a complex periodic 440 Hz tone is played three times, each time with a different envelope. The example is presented twice. IPO II.4
- 5 The Effect of Spectrum on Timbre
- 6 Synthetic and recorded brass sounds  
Change in Timbre with Transposition  
Infinte Glissand  
to do
- 7 Infinte Accelerand & Decellerando IPO V.28
- 8 to do
- 9 IPO V.30
- ? IPO?  
Pierce -redo

## FREQUENCY ANALYSIS AND CRITICAL BAND

### 1. Cancelled Harmonics

- 1 A complex 200 Hz tone with 20 harmonics is played. Harmonics are switched on and off. Demonstrates that complex tones are made up of simple tones. Also demonstrates *holistic* vs *analytical* listening.

### 2. Critical Bands by Masking

- 2 2kHz tone, 10 steps of 5 dB. Series presented twice.

- 3 series masked with white noise
- 4 series masked with 1kHz noise
- 5 series masked with 250 Hz noise
- 6 series masked by 10 Hz noise

**3. Critical Bands by Loudness Comparisons**

- 7 2kHz tone, 10 steps of 5 dB. Series presented twice.

**SOUND PRESSURE, POWER & LOUDNESS**

**4. The Decibel Scale**

- 8 Broadband noise reduced in 10 steps of 6 dB (x2)
- 9 Broadband noise reduced in 15 steps of 3 dB (x2)
- 10 Broadband noise reduced in 20 steps of 1 dB (x2)
- 11 Free-field speech at various distances from microphone.

**5. Filtered Noise**

- 12 White noise
- 13 Noise through low-pass filter with decreasing cut-off
- 14 Noise through high-pass filter with increasing cut-off
- 15 1/3 octave noise bands, increasing centre frequencies
- 16 white and pink noise with same power

**6. Frequency Response of Ear**

- 17 Calibration tone
- 18 tones of different frequencies, repeated 10 x in steps of 5 dB

**7. Loudness Scaling**

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- 20

**8. Temporal Integration**

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**MASKING**

**9. Asymmetry of masking by pulsed tones**

- 22 low masker (1200 Hz) repeated alternately with higher (2000 Hz) tone. Test tone decreases in 10 steps of 5dB, except 1st which is 15 dB. Second time around, roles are reversed. Masker is high and tone is low.

#### **10 Backward and forward masking**

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#### **11 Pulsation threshold**

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### **PITCH OF PURE TONES**

#### **12 Dependence of pitch on intensity**

27 Calibration tone

28 6 tone pairs at various frequencies. Each pair has same frequency, but differ by 30 dB in intensity. Compare pitches of pairs

#### **13 Pitch saliance by duration**

29 tones of increasing duration are presented. note change from click to tone.

#### **14 Influence of masking noise on pitch**

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#### **15 Octave matching**

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#### **16 Stretched and compressed scales**

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#### **17 Frequency JND**

33 1/30 of critical band

#### **18 Logarithmic and linear frequency scales**

34 8-note diatonic, linear and log (x 2)

35 13-note chromatic scale, linear and log (x 2)

#### **19 Pitch streaming**

36 repeated pitch alternating with rising and falling tone

### **PITCH OF COMPLEX TONES**

## **20 Virtual pitch (missing fundamental)**

37 complex tone, repeated with lower harmonics successively removed. Pitch stays same.

## **21 Shift of virtual pitch**

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## **22 Masking spectral and virtual pitch**

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## **23 Virtual pitch and random harmonics**

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## **24 Strike note of a chime**

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## **25 Analytic vs synthetic pitch**

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## **26 Scales with repetition pitch**

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## **27 Circularity in pitch judgement paradox**

52 discrete Shepard & continuous by Risset

## **TIMBRE**

### **28 Effect of spectrum on timbre**

53 adding harmonics, one-by-one (chime & guitar)

### **29 Effect of tone envelope on timbre**

54 Bach chorale on piano

55 Played backwards (musically)

56 Tape of preceding played backwards

**30 Change in timbre with transposition**

57 3 8ve scale on bassoon (a) normal, (b) one note transposed over same scale.

**31 Tones and tuning with stretched partials**

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**BEATS, COMBINATION TONES, ....**

**32 Primary and secondary beats**

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**33 Distortion**

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**34 Aural combination tones**

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**35 Effect of echoes**

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**36 Binaural beats**

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**37 Binaural lateralization**

72 two tones with phase difference

73 click with interaural difference in on-set time

74 tones with differing amplitude cues

**38 Masking level differences**

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**39 An auditory illusion**

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