

Music 170 Homework problem set 6 (due Nov. 6)

1. Assume you can hear beating between two sinusoids once the rate of beating falls below 20 Hz. What is the highest pitch at which a half-tone interval beats audibly?
2. What pitch from the standard Western tempered scale is closest to 1000 Hz? Is it higher or lower? By how many cents?
3. Two complex, periodic tones, middle C and the G above it, are sounded simultaneously. Which are the lowest harmonics of the two that would beat (at 20 Hz. or less), and how fast? (G is 7 semitones above C).
4. A series of Helmholtz resonators are arranged to make a musical scale that covers two octaves. Assume that only the volumes are different (i.e., that length and area are the same for all the resonators.) How much larger must the largest volume be than the smallest (as a ratio)?
5. Suppose a tempered and a just-intonation scale are constructed, one octave each, starting at 'C' (261.62 Hz). By how many Hz. does the 'E' on the tempered scale differ from the just one?