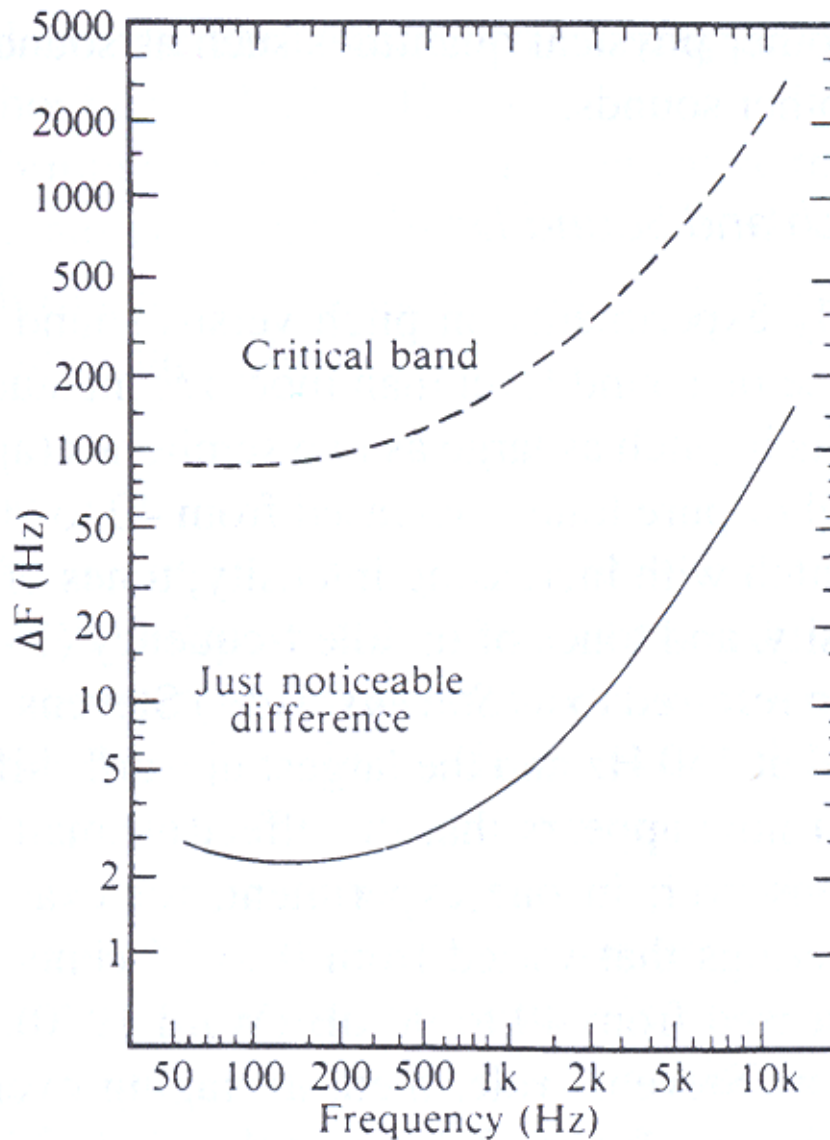


The typical human ear can discern **changes** in pitch/frequency at the $\Delta f \sim 3 \text{ Hz}$ level in the frequency range $\sim 30 \text{ Hz} \leq f \leq 1000 \text{ Hz}$. Again, has frequency dependence:



Note that:

At very low frequencies: $\Delta f/f \simeq 3/30 = 10\%$ ($\simeq 2$ semitones),

Whereas at higher frequencies: $\Delta f/f \simeq 3/1000 = 0.3\%$ ($\simeq 0.1$ semitones)

A good musician can discern frequency changes **significantly** smaller than this – e.g. above $f \geq 500 \text{ Hz}$: ≈ 0.03 semitone (i.e. $\Delta f/f \simeq 1/1000 = 0.1\%$)!!!

\therefore The human ear/brain is capable of detecting small changes in frequency!!!