[2019-2 영어음성학]

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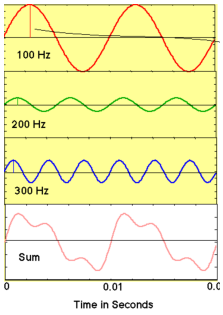
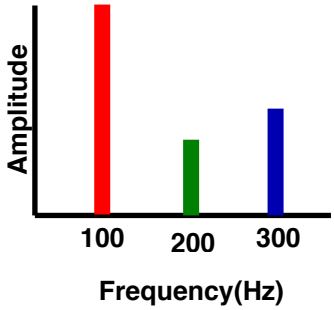
Articulation	CL	CD	Velum	Larynx
/p/	bilabial	stop	raised	open
/d/	alveolar	stop	raised	closed
/z/	alveolar	fricative	raised	closed
/n/	alveolar	stop	lowered	closed

Week2 Summary

Every signal(including sounds) can be expressed with a synthesis of various sine waves. We call sounds of a sine wave as a simplex(pure) tone and a sum of sine waves as a complex tone. A sine wave is shaped by frequency and amplitude of a sound over time. A lower frequency means fewer vibrations in vocal cords, which produces sparse graph and vice versa. 100Hz signifies 100 times of vibrations per second and, if doubled, it becomes 200Hz. Amplitude; air pressure, is not an intrinsic value of a sound source but varies over a wide range depending on the distance, closer the bigger, thus, producing bigger graph and vice versa.



In the graph left-side where sound waveforms are depicted, x-axis means time in seconds and y-axis means value. In spectrum right-side(spectral slice of spectrogram), x-axis corresponds to frequency(Hz) and y-axis corresponds to amplitude over time. Spectrogram is a temporal concatenation of spectrum, its x-axis being time and y-axis being frequency. Light-Dark gradation represents the amplitude of each frequency, lower in frequency being darker in the case of a pure tone spectrogram.



Human voice source is a sound at larynx, which can be measured by ElectroGlottoGraph(EGG). When we focus on the sound pitch(magnitude and frequency, source can be sorted as a complex tone, consisting of harmonics. A complex tone is a sum of pure tones at integer multiples of the lowest pure tone(fundamental frequency = F0 = pitch). Source-filter theory represents speech production process where sound sources of distinct spectrum are filtered by the resonant properties of the vocal tract. While source shows gradually decreasing graph in the frequency spectrum, filtered by vocal tract(audio) shows zigzagging(carved) graph with peaks and valleys. Amplitude Peaks in the frequency spectrum of the sound are analyzed as formants, the spectral shaping by acoustic resonances of the vocal tract. The formant with the lowest frequency is called F1, the second F2. In a graph where x-axis is F2 and y-axis is F1, corresponding to the geometry of mouth, we can locate every monophthong as spots and diphthong as lines, as x-axis determines front/back position and y-axis determines height of vowels.