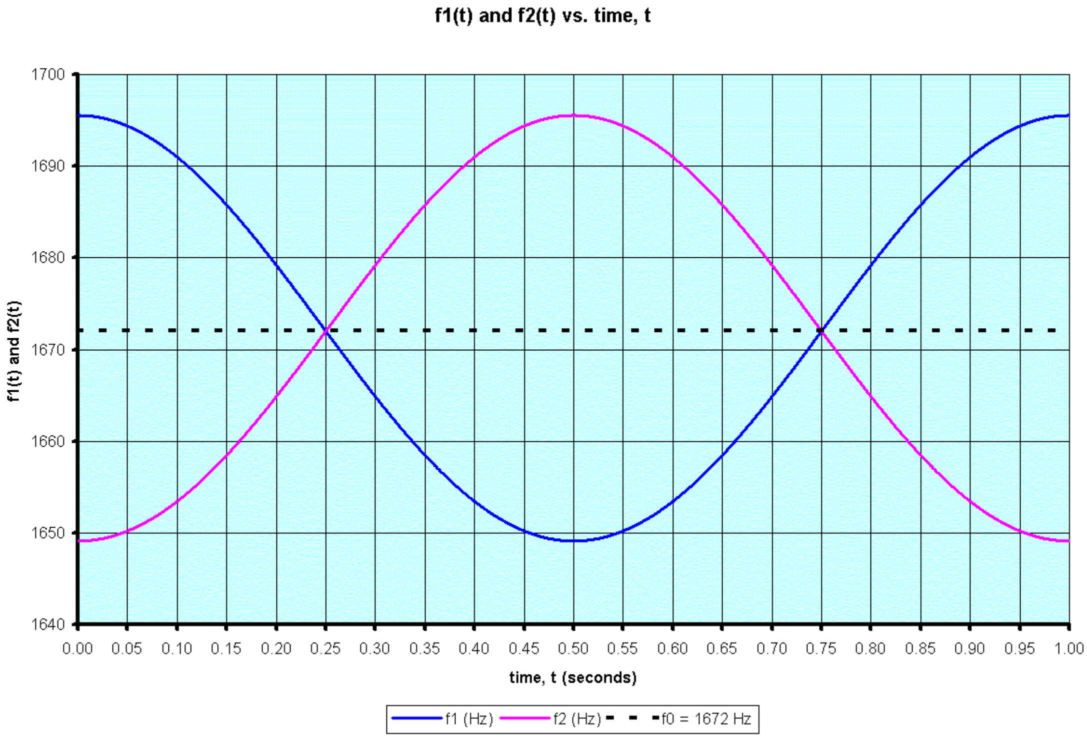

If the individual displacement amplitudes associated with the sounds emanating from each of the two individual sound sources are given by:

$$y_1(x,t) = A_1 \cos(\omega_1 t) = A_1 \cos(2\pi f_1 t)$$

and

$$y_2(x,t) = A_2 \cos(\omega_2 t) = A_2 \cos(2\pi f_2 t)$$

Then the total displacement amplitude is just the linear sum of the two individual amplitudes:

$$y_{tot}(x,t) = y_1(x,t) + y_2(x,t) = A_1 \cos(\omega_1 t) + A_2 \cos(\omega_2 t) = A_1 \cos(2\pi f_1 t) + A_2 \cos(2\pi f_2 t)$$

In the first figure below, we show the total displacement amplitude, $y_{tot}(x,t) = y_1(x,t) + y_2(x,t)$ for the first $^1/_{10}$ of a rotational period, τ so that the high-frequency structure associated with the two individual frequencies, f_1 and f_2 (~ 1670 ± 23 Hz) can be readily observed. The *envelope* of the high-frequency waveform is modulated at the beat frequency, $\Delta f = |\, f_1' - f_2' |$.