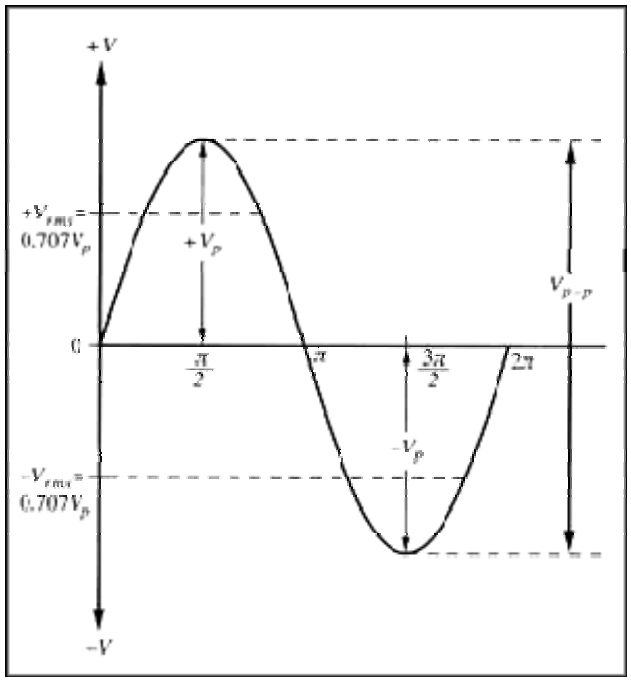
Famliar/Everyday Example: The 120 Volts/60 *Hz* AC line voltage in your house actually refers to the *RMS* voltage, *i.e*. the *RMS* voltage amplitude is V_{rms} = 120 Volts @ f = 60 *Hz*, hence the actual voltage amplitude (*aka* the peak amplitude) is $V_p = \sqrt{2} \cdot V_{rms} = 1.414 \cdot 120 = 169.7 \simeq 170\, Volts$.



The time-averaged, or *RMS* sound intensity *threshold* of hearing (@ f = 1 KHz) is:
$\langle I_{thr} \rangle \sim 2.5 \times 10^{-12}$ *RMS Watts*/m^2 = 2.5 *RMS pico-Watts*/m^2

Individual people may hear better/worse than the average person, and so threshold of hearing from one person to another can vary as much as 1/10 or 10× this!!! Since the human ear has an ~ logarithmic response to sound intensity, linear factors of ~ 2.5× are not really very significant, and thus for convenience' sake, we simply round this down to the so-called reference standard for the {average} sound intensity threshold of hearing, defined as:

$$\langle I_o \rangle = I_{o\,rms} = 10^{-12}\ RMS\ Watts/m^2$$ as the official Intensity Threshold of Hearing.

Using $I_{rms} = p_{rms}^2 / \rho_o c$ with $\rho_o = 1.204\, kg/m^3$ and $c = 343\, m/s$ (@ NTP), we find that $\langle I_o \rangle = I_{o\,rms} = 10^{-12}\ RMS\ Watts/m^2$ corresponds to a *RMS* sound over-pressure threshold of

$$p_{o\,rms} = 2.0322 \times 10^{-5}\ RMS\ Newtons/m^2 \simeq 2 \times 10^{-5}\ RMS\ Pascals.$$

However, the sensitivity of human hearing is frequency dependent over the entire audio spectrum, and in fact the *RMS* reference intensity and pressure amplitudes $I_{o\,rms}$ and $p_{o\,rms}$ are specifically associated with pure tone/sine waves of frequency f = 1 *KHz*, because the human ear is most sensitive in the $f \sim 1$ – few *KHz* range, as shown in the figure below: