



# How do Sound Pressure Levels add when listening?

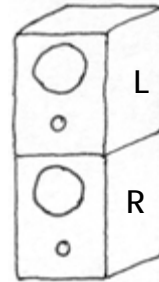
– Electroacoustic considerations for higher terms –

German: "Wie addieren sich Schalldruckpegel beim Hören?" <http://www.sengpielaudio.com/WieAddierenSichSchalldruckpegel.pdf>

How do we hear and how do we measure the combining of two signals? We are considering the addition of coherent and incoherent electrical source signals, as well as the addition of coherent and incoherent (non-coherent) acoustic reproduced signals.

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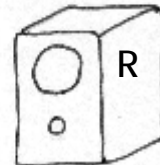
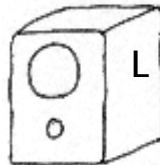
Two loudspeakers are placed tightly together.



First case: From one speaker comes the sound of a violin, from the other speaker the sound of a trumpet. The musical instruments are panned on the mixer according to hard L and R and showing on both meters (PPM) the level of 0 dB = 100%.

Second case: Both musical instruments are mixed together by panpots to the stereo center and the level is set so that each meter (PPM) displays the level of 0 dB = 100%.

Loudspeakers in typical stereo position.



Third case: From one speaker comes the sound of a violin, from the other speaker the sound of a trumpet. The musical instruments are panned on the mixer according to hard L and R and showing on both meters (PPM) the level of 0 dB = 100%.

Fourth case: Both musical instruments are mixed together by panpots to the stereo center and the level is set so that each meter (PPM) displays the level of 0 dB = 100%.

## • Questions:

1 - How different is case 1 from 2 in "volume"?

2 - How different is case 3 from case 4 in "volume"?

3 - In what order of soft to loud would you put the cases with the help of a sound level meter at always the same "listening distance" from the loudspeakers. Find the order of the measured lowest level to the highest level. Instead of a trumpet and a violin it will be practical to use pink noise as test signal for better reading the meters.

Total level adding of acoustical incoherent sound sources <http://www.sengpielaudio.com/calculator-leveladding.htm>

Total level adding of electrical coherent signals <http://www.sengpielaudio.com/calculator-coherentsources.htm>