CLAIMS

1. A dereverberation device comprising:

an input instantaneous value calculation unit configured to calculate an input instantaneous value based on an input signal;

a reverberation estimation unit configured to calculate a moving average of the input instantaneous value as a reverberation component;

a gain calculation unit configured to calculate, with the input instantaneous value and the reverberation component, a first gain as a basic gain for the input signal;

a gain suppression control unit configured to calculate, according to a ratio between the input instantaneous value and the reverberation component, a second gain changing within a range between a predetermined lower limit and a predetermined upper limit, thereby outputting a larger one of the first gain or the second gain as a third gain; and

a gain processing unit configured to multiply the input signal by the third gain.

2. The dereverberation device according to claim 1, wherein the input instantaneous value is calculated based on an envelope of a value correlating with an absolute value or a square of the input signal, and the reverberation component is calculated according to an index moving average of the input instantaneous value.

3. The dereverberation device according to claim 1, wherein the gain suppression control unit gradually decreases the second gain toward the lower limit in a case where the input instantaneous value is smaller than the reverberation component, and increases

the second gain toward the upper limit in other cases than the case where the input instantaneous value is smaller than the reverberation component.

4. The dereverberation device according to claim 1, further comprising: a smoothing unit configured to perform smoothing by smoothing processing for the third gain.

5. The dereverberation device according to claim 1, further comprising:

an analysis filter bank configured to divide an external input signal into multiple input signals as multiple frequency band components; and

a composite filter bank configured to synthesize the multiple frequency band components output from the gain processing unit to generate an output signal,

wherein each of the multiple frequency bands corresponds to one of the input instantaneous value calculation units, one of the reverberation estimation units, one of the gain calculation units, and one of the gain suppression control units.

6. The dereverberation device according to claim 5, wherein the lower limit and the upper limit are set separately for each of the multiple frequency bands.

7. A hearing aid comprising:

a microphone configured to convert sound into an electric signal;

a receiver configured to convert an electric signal into sound;

an input instantaneous value calculation unit configured to calculate an input instantaneous value based on an input signal extracted from an output signal from the microphone;

a reverberation estimation unit configured to calculate a moving average of the input instantaneous value as a reverberation component;

a gain calculation unit configured to calculate, with the input instantaneous value and the reverberation component, a first gain as a basic gain for the input signal;

a gain suppression control unit configured to calculate, according to a ratio between the input instantaneous value and the reverberation component, a second gain changing within a range between a predetermined lower limit and a predetermined upper limit, thereby outputting a larger one of the first gain or the second gain as a third gain; and

a hearing aid processing unit configured to perform hearing aid processing according to a user for the input signal and including a gain processing unit configured to multiply the input signal by the third gain.