## CLAIMS

1. A method for estimating noise in an audio signal, the method comprising:

determining an energy value for the audio signal;

converting the energy value into the log2-domain; and

estimating a noise level for the audio signal based on the converted energy value directly in the log2-domain,

wherein the energy value is converted into the log2-domain as follows:

$$E_{n_log} = \frac{\lfloor (\log_2(1 + E_{n_lin})) \cdot 2^N \rfloor}{2^N}$$

$\lfloor x \rfloor$ floor (x),

$E_{n_log}$ energy value of band n in the log2-domain,

$E_{n_lin}$ energy value of band n in the linear domain,

$N$ quantization resolution.

2. The method of claim 1, wherein estimating the noise level comprises performing a predefined noise estimation algorithm, like the minimum statistics algorithm.

3. The method of claim 1 or 2, wherein determining the energy value comprises obtaining a power spectrum of the audio signal by transforming the audio signal into the frequency domain, grouping the power spectrum into psychoacoustically motivated bands, and accumulating the power spectral bins within a band to form an energy value for each band, wherein the energy value for each band is converted into the log2-domain, and wherein a noise level is estimated for each band based on the corresponding converted energy value.

4. The method of claim 3, wherein the audio signal comprises a plurality of frames, and wherein for each frame the energy value is determined and converted into the log2-domain, and the noise level is estimated for each band of a frame based on the converted energy value.

5. The method of one of claims 1 to 4, wherein estimating the noise level based on the converted energy value yields logarithmic data, and wherein the method further comprises:

using the logarithmic data directly for further processing, or

converting the logarithmic data back into the linear domain for further processing.

6. The method of claim 5, wherein

the logarithmic data is converted directly into transmission data, in case a transmission is done in the logarithmic domain, and

converting the logarithmic data directly into transmission data uses a shift function together with a lookup table or an approximation, e.g., $E_{n_lin} = 2^{(E_{n_log}-1)}$.

7. A non-transitory computer program product comprising a computer readable medium storing instructions which, when executed on a computer, carry out the method of one of claims 1 to 6.

8. A noise estimator, comprising:

a detector configured to determine an energy value for the audio signal;

a converter configured to convert the energy value into the log2-domain; and

an estimator configured to estimate a noise level for the audio signal based on the converted energy value directly in the log2-domain,

wherein the energy value is converted into the log2-domain as follows:

$$E_{n_log} = \frac{\lfloor (\log_2(1 + E_{n_lin})) \cdot 2^N \rfloor}{2^N}$$

$\lfloor x \rfloor$ floor (x),

$E_{n_log}$ energy value of band n in the log2-domain,

$E_{n_lin}$ energy value of band n in the linear domain,

$N$ quantization resolution.

9. An audio encoder, comprising a noise estimator of claim 8.

10. An audio decoder, comprising a noise estimator of claim 8.

11. A system for transmitting audio signals, the system comprising:

an audio encoder configured to generate coded audio signal based on a received audio signal; and

an audio decoder configured to receive the coded audio signal, to decode the coded audio signal, and to output the decoded audio signal,

wherein at least one of the audio encoder and the audio decoder comprises a noise estimator of claim 8.

## CLAIMS

1. A method for estimating noise in an audio signal (102), the method comprising:

determining (S100) an energy value (174) for the audio signal (102);

converting (S102) the energy value (174) into the log2-domain; and

estimating (S104) a noise level (182) for the audio signal (102) based on the converted energy value (178) directly in the log2-domain on a processor using fixed point arithmetic.

2. The method of claim 1, wherein estimating (S104) the noise level comprises performing a predefined noise estimation algorithm, like the minimum statistics algorithm.

3. The method of claim 1 or 2, wherein determining (S100) the energy value (174) comprises obtaining a power spectrum of the audio signal (102) by transforming the audio signal (102) into the frequency domain, grouping the power spectrum into psychoacoustically motivated bands, and accumulating the power spectral bins within a band to form an energy value (174) for each band, wherein the energy value (174) for each band is converted into the log2-domain, and wherein a noise level is estimated for each band based on the corresponding converted energy value (174).

4. The method of claim 3, wherein the audio signal (102) comprises a plurality of frames, and wherein for each frame the energy value (174) is determined and converted into the log2-domain, and the noise level is estimated for each band of a frame based on the converted energy value (174).

5. The method of one of claims 1 to 4, wherein the energy value (174) is converted (S102) into the log2-domain as follows:

$$E_{n_log} = \frac{\lfloor (\log_2(1 + E_{n_lin})) \cdot 2^N \rfloor}{2^N}$$

$\lfloor x \rfloor$ floor (x),

$E_{n_log}$ energy value of band n in the log2-domain,

$E_{n_lin}$ energy value of band n in the linear domain,

$N$ quantization resolution.

6. The method of one of claims 1 to 5, wherein estimating (S104) the noise level based on the converted energy value (178) yields logarithmic data, and wherein the method further comprises:

using (S108) the logarithmic data directly for further processing, or

converting (S110, S112) the logarithmic data back into the linear domain for further processing.

7. The method of claim 6, wherein

the logarithmic data is converted (S108) directly into transmission data, in case a transmission is done in the logarithmic domain, and

converting (S110) the logarithmic data directly into transmission data uses a shift function together with a lookup table or an approximation, e.g., $E_{n_lin} = 2^{(E_{n_log}-1)}$.

8. A non-transitory computer program product comprising a computer readable medium storing instructions which, when executed on a computer, carry out the method of one of claims 1 to 7.

9. A noise estimator (170), comprising:

a detector (172) configured to determine an energy value (174) for the audio signal (102);

a converter (176) configured to convert the energy value (174) into the log2-domain; and

an estimator (180) configured to estimate a noise level (182) for the audio signal (102) based on the converted energy value (178) directly in the log2-domain, the estimator comprising a processor using fixed point arithmetic.

10. An audio encoder (100), comprising a noise estimator of claim 9.

11. An audio decoder (150), comprising a noise estimator (170) of claim 9.

PCT/EP 2015/066 657

12. A system for transmitting audio signals (102), the system comprising:

an audio encoder (100) configured to generate coded audio signal (102) based on a received audio signal (102); and

an audio decoder (150) configured to receive the coded audio signal (102), to decode the coded audio signal (102), and to output the decoded audio signal (102),

wherein at least one of the audio encoder and the audio decoder comprises a noise estimator (170) of claim 9.