Claims

1. Multi-channel signal generator ~~(200)~~ for generating a multi-channel signal ~~(204)~~ having a first channel ~~(201)~~ and a second channel ~~(203)~~, comprising:

a first audio source ~~(211)~~ for generating a first audio signal ~~(221)~~;

a second audio source ~~(213)~~ for generating a second audio signal ~~(223)~~;

a mixing noise source ~~(212)~~ for generating a mixing noise signal ~~(222)~~; and

a mixer ~~(206)~~ for mixing the mixing noise signal ~~(222)~~ and the first audio signal ~~(221)~~ to obtain the first channel ~~(201)~~ and for mixing the mixing noise signal ~~(222)~~ and the second audio signal ~~(222)~~ to obtain the second channel ~~(203).~~,

wherein the mixer ~~(206)~~ comprises:

a first amplitude element ~~(208-1)~~ for influencing an amplitude of the first audio signal ~~(221)~~;

a first adder ~~(206-1)~~ for adding an output signal ~~(221)~~ of the first amplitude element and at least a portion of the mixing noise signal ~~(222)~~;

a second amplitude element ~~(208-3)~~ for influencing an amplitude of the second audio signal ~~(223)~~;

a second adder ~~(206-3)~~ for adding an output ~~(223)~~ of the second amplitude element ~~(208-3)~~ and at least a portion of the mixing noise signal ~~(222)~~,

wherein an amount of influencing performed by the first amplitude element and an amount of influencing performed by the second amplitude element are equal to each other or the amount of influencing performed by the second amplitude element is different by less than 20 percent of the amount performed by the first amplitude element,

wherein the mixer ~~(206)~~ comprises a third amplitude element ~~(208-2)~~ for influencing an amplitude of the mixing noise signal ~~(222)~~,

wherein an amount of influencing performed by the third amplitude element ~~(208-2)~~ depends on the amount of influencing performed by the first amplitude element ~~(208-1)~~ or the second amplitude element ~~(208-3)~~, so that the amount of influencing performed by the third amplitude element ~~(208-2)~~ becomes greater when the amount of influencing performed by the first amplitude element or the amount of influencing performed by the second amplitude element ~~(208-3)~~ becomes smaller.

2. The channel signal generator claimed in claim 1, wherein the first audio source ~~(211)~~ is a first noise source and the first audio signal ~~(221)~~ is a first noise signal, and/or the second audio source ~~(213)~~ is a second noise source and the second audio signal ~~(223)~~ is a second noise signal,

wherein the first noise source ~~(211)~~ and/or the second noise source ~~(213)~~ is configured to generate the first noise signal ~~(221)~~ and/or the second noise signal ~~(223)~~ so that the first noise signal ~~(221)~~ and/or the second noise signal ~~(223)~~ is decorrelated from the mixing noise signal ~~(222)~~.

3. Multi-channel signal generator as claimed in claim 1 or 2, wherein the mixer ~~(206)~~ is configured to generate the first channel ~~(201)~~ and the second channel ~~(203)~~ so that an amount of the mixing noise signal ~~(222)~~ in the first channel ~~(201)~~ is equal to an amount of the mixing noise signal ~~(222)~~ in the second channel ~~(203)~~ or is within a range of 80 percent to 120 percent of the amount of the mixing noise signal ~~(222)~~ in the second channel ~~(203)~~.

4. Multi-channel signal generator as claimed in one of the preceding claims, wherein the mixer ~~(206)~~ comprises a control input for receiving a control parameter ~~(404, c)~~, and wherein the mixer ~~(206)~~ is configured to control an amount of the mixing noise signal ~~(222)~~ in the first channel ~~(201)~~ and the second channel ~~(203)~~ in response to the control parameter ~~(404, c)~~.

5. Multi-channel signal generator as claimed in one of the preceding claims, wherein each of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ is a Gaussian noise source.

6. Multi-channel signal generator as claimed in one of the preceding claims,

wherein the first audio source ~~(211)~~ comprises a first noise generator to generate the first audio signal ~~(221)~~ as a first noise signal, wherein the second audio source ~~(213)~~ comprises a decorrelator for decorrelating the first noise signal ~~(221)~~ to generate the second audio signal ~~(213)~~ as a second noise signal, and wherein the mixing noise source ~~(212)~~ comprises a second noise generator~~, or~~ .

7. Multi-channel signal generator as claimed in one of claims 1 to 5,

wherein the first audio source ~~(211)~~ comprises a first noise generator ~~(211)~~ to generate the first audio signal ~~(221)~~ as a first noise signal, wherein the second audio source ~~(213)~~ comprises a second noise generator ~~(213)~~ to generate the second audio signal ~~(223)~~ as a second noise signal, and wherein the mixing noise source ~~(212)~~ comprises a decorrelator for decorrelating the first noise signal ~~(221)~~ or the second noise signal ~~(223)~~ to generate the mixing noise signal ~~(222), or~~ .

8. Multi-channel signal generator as claimed in one of claims 1 to 5,

wherein one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ comprises a noise generator to generate a noise signal, and wherein another one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ comprises a first decorrelator for decorrelating the noise signal, and wherein a further one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ comprises a second decorrelator for decorrelating the noise signal, wherein the first decorrelator and the second decorrelator are different from each other so that output signals of the first decorrelator and the second decorrelator are decorrelated from each other~~, or~~.

9. Multi-channel signal generator as claimed in one of claims 1 to 5,

wherein the first audio source ~~(211)~~ comprises a first noise generator, wherein the second audio source ~~(213)~~ comprises a second noise generator, and wherein the mixing noise source ~~(212)~~ comprises a third noise generator, wherein the first noise generator, the second noise generator and the third noise generator are configured to generate mutually decorrelated noise signals.

~~7~~10. Multi-channel signal generator as claimed in one of the preceding claims,

wherein one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ comprises a pseudo random number sequence generator configured for generating a pseudo random number sequence in response to a seed, and wherein at least two of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ are configured to initialize the pseudo random number sequence generator using different seeds.

~~8~~11. Multi-channel signal generator as claimed in one of claims 1 to 6,

wherein at least one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ is configured to operate using a pre-stored noise table~~, or~~.

12. Multi-channel signal generator as claimed in one of claims 1 to 6,

wherein at least one of the first audio source ~~(211)~~, the second audio source ~~(213)~~ and the mixing noise source ~~(212)~~ is configured to generate a complex spectrum for a frame using a first noise value for a real part and a second noise value for an imaginary part~~,~~.

~~wherein, optionally,~~

13. Multi-channel signal generator as claimed in one of claims 11 and 12,wherein at least one noise generator is configured to generate a complex noise spectral value for a frequency bin k using for one of the real part and the imaginary part, a first random value at an index k and using, for the other one of the real part and the imaginary part, a second random value at an index (k+M), wherein the first noise value and the second noise value are included in a noise array, e.g. derived from a random number sequence generator or a noise table or a noise process, ranging from a start index to an end index, the start index being lower than M, and the end index being equal to or lower than 2M, wherein M and k are integer numbers.

~~9. Multi-channel signal generator as claimed in one of the preceding claims,~~

~~wherein an amount of influencing performed by the first amplitude element (208-1) and an amount of influencing performed by the second amplitude element (208-3) are equal to each other or the amount of influencing performed by the second amplitude element (208-3) is different by less than 20 percent of the amount performed by the first amplitude element (208-1).~~

~~10. Multi-channel signal generator as claimed in claim 9,~~

~~11~~14. Multi-channel signal generator as claimed in one of the preceding claims,

wherein the amount of influencing performed by the third amplitude element ~~(208-2)~~ is the square root of a predetermined value ~~(c_q)~~ and an amount of influencing performed by the first amplitude element ~~(208-1)~~ and an amount of influencing performed by the second amplitude element ~~(208-3)~~ is the square root of the difference between ~~one~~1 and the predetermined value ~~(c_q)~~.

~~12~~15. Multi-channel signal generator of one of the preceding claims, further comprising:

an input interface ~~(210)~~ for receiving encoded audio data ~~(232)~~ in a sequence of frames ~~(306, 308)~~ comprising an active frame ~~(306)~~ and an inactive frame ~~(308)~~ following the active frame ~~(306)~~; and

an audio decoder ~~(200', 200a, 200b)~~ for decoding coded audio data for the active frame ~~(306)~~ to generate a decoded multi-channel signal for the active frame,

wherein the first audio source ~~(211)~~, the second audio source ~~(213)~~, the mixing noise source ~~(212)~~ and the mixer ~~(206)~~ are active in the inactive frame ~~(308)~~ to generate the multi-channel signal ~~(204)~~ for the inactive frame.

~~13.~~16 Multi-channel signal generator as claimed in ~~any of the preceding claims~~claim 15, wherein:

the encoded audio ~~signal~~data ~~(232)~~ for the active frame ~~(306)~~ has a first plurality of coefficients describing a first number of frequency bins; and

the encoded audio ~~signal~~data ~~(232)~~ for the inactive frame ~~(308)~~ has a second plurality of coefficients describing a second number of frequency bins,

wherein the first number of frequency bins is greater than the second number of frequency bins.

~~14~~17. Multi-channel signal generator ~~as claimed in claim 12 or 13~~ for generating a multi-channel signal having a first channel and a second channel, comprising:

a first audio source for generating a first audio signal;

a second audio source for generating a second audio signal;

a mixing noise source for generating a mixing noise signal;

a mixer for mixing the mixing noise signal and the first audio signal to obtain the first channel and for mixing the mixing noise signal and the second audio signal to obtain the second channel,

an input interface for receiving encoded audio data in a sequence of frames comprising an active frame and an inactive frame following the active frame; and

an audio decoder for decoding coded audio data for the active frame to generate a decoded multi-channel signal for the active frame,

wherein the first audio source, the second audio source, the mixing noise source and the mixer are active in the inactive frame to generate the multi-channel signal for the inactive frame,

wherein the encoded audio data ~~(232)~~ for the inactive frame ~~(308)~~ comprises silence insertion descriptor data ~~(p_noise, c)~~ comprising comfort noise data ~~(c, p_noise)~~ indicating a signal energy ~~(1312)~~ for each channel of the two channels ~~(301, 303)~~, or for each of a first linear combination of the first and second channels and a second linear combination of the first and second channels, for the inactive frame and indicating a coherence ~~(404, c)~~ between the first channel ~~(301)~~ and the second channel ~~(303)~~ in the inactive frame, and

wherein the mixer ~~(206, 220)~~ is configured to mix ~~(206-1, 206-3)~~ the mixing noise signal ~~(222)~~ and the first audio signal ~~(221)~~ or the second audio signal ~~(223)~~ based on the comfort noise data indicating the coherence ~~(404, c)~~, and

wherein the multi-channel signal generator ~~(200, 220, 220a-220e)~~ further comprises a signal modifier ~~(250)~~ for modifying the first channel ~~(201)~~ and the second channel ~~(203)~~ or the first audio signal ~~(221)~~ or the second audio signal ~~(223)~~ or the mixing noise signal ~~(222)~~,

wherein the signal modifier ~~(250)~~ is configured to be controlled by the comfort noise data ~~(p_noise)~~ indicating signal energies for the first audio channel ~~(301)~~ and the second audio channel ~~(303)~~ or indicating signal energies for a first linear combination of the first and second channels and a second linear combination of the first and second channels.

~~15~~18. Multi-channel signal generator as claimed in ~~claim 12 or 13 or 14~~any of claims 15-17, wherein the audio data ~~(232)~~ for the inactive frame comprises:

a first silence insertion descriptor frame ~~(241)~~ for the first channel ~~(201)~~ and a second silence insertion descriptor frame ~~(243)~~ for the second channel ~~(203)~~, wherein the first silence insertion descriptor frame ~~(241)~~ comprises

comfort noise parameter data ~~(p_noise)~~ for the first channel ~~(201)~~, and/or for a first linear combination of the first and second channels, and

comfort noise generation side information ~~(p_frame)~~ for the first channel and the second channel ~~(203)~~, and

wherein the second silence insertion descriptor frame ~~(243)~~ comprises

comfort noise parameter data ~~(p_noise)~~ for the second channel ~~(203)~~, and/or for a second linear combination of the first and second channels and

coherence information ~~(404, c)~~ indicating a coherence between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and

wherein the multi-channel signal generator comprises a controller for controlling the generation of the multi-channel signal ~~(204)~~ in the inactive frame using the comfort noise generation side information ~~(p_frame)~~ for the first silence insertion descriptor frame ~~(241)~~ to determine a comfort noise generation mode for the first channel ~~(201)~~ and the second channel ~~(203)~~, and/or for a first linear combination of

the first and second channels and a second linear combination of the first and second channels, using the coherence information ~~(404, c)~~ in the second silence insertion descriptor frame ~~(243)~~ to set a coherence ~~(404, c)~~ between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and using the comfort noise parameter data ~~(p_noise)~~ from the first silence insertion descriptor frame ~~(241)~~ and using the comfort noise parameter data ~~(p_noise)~~ from the second silence insertion descriptor frame ~~(243)~~ for setting an energy situation ~~($v_{l,q}$)~~ of the first channel ~~(301)~~ and an energy situation ~~($v_{r,q}$)~~ of the second channel ~~(303)~~.

~~16~~19. Multi-channel signal generator as claimed in ~~claim 12 or 13 or 14 or~~any of claims 15~~-~~18, wherein the audio data ~~(232)~~ for the inactive frame comprises:

at least one silence insertion descriptor frame ~~(241)~~ for a first linear combination of the first and second channels and a second linear combination of the first and second channels,

wherein the at least one silence insertion descriptor frame ~~(241)~~ comprises

comfort noise parameter data ~~(p_noise)~~ for the first linear combination of the first and second channels, and

comfort noise generation side information ~~(p_frame)~~ for the second linear combination of the first and second channels,

wherein the multi-channel signal generator comprises a controller for controlling the generation of the multi-channel signal ~~(204)~~ in the inactive frame using the comfort noise generation side information ~~(p_frame)~~ for the first linear combination of the first and second channels and the second linear combination of the first and second channels, using the coherence information ~~(404, c)~~ in the second silence insertion descriptor frame ~~(243)~~ to set a coherence ~~(404, c)~~ between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and using the comfort noise parameter data ~~(p_noise)~~ from the at least one silence insertion descriptor frame ~~(241)~~ and using the comfort noise parameter data ~~(p_noise)~~ from the at least one silence insertion descriptor frame ~~(243)~~ for setting an energy situation ~~($v_{l,q}$)~~ of the first channel ~~(301)~~ and an energy situation ~~($v_{r,q}$)~~ of the second channel ~~(303)~~.

~~17~~20. Multi-channel signal generator as claimed in ~~claim 14 or 15 or 16~~any of claims 17~~-~~19, further comprising a spectrum-time converter for converting a resulting first channel and a resulting second channel being spectrally adjusted and coherence-ad-

justed, into corresponding time domain representations to be combined with or concatenated to time domain representations of corresponding channels of the decoded multi-channel signal for the active frame.

~~18~~21. Multi-channel signal generator as claimed in any of claims ~~12~~15 to ~~17~~20, wherein the audio data for the inactive frame comprises:

a silence insertion descriptor frame ~~(241, 243)~~, wherein the silence insertion descriptor frame ~~(241, 243)~~ comprises comfort noise parameter data ~~(p_noise)~~ for the first and the second channel ~~(201, 203)~~ and comfort noise generation side information ~~(p_frame)~~ for the first channel ~~(203)~~ and the second channel ~~(203)~~ and/or for a first linear combination of the first and second channels and a second linear combination of the first and second channels, and coherence information ~~(404, c)~~ indicating a coherence between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and

wherein the multi-channel signal generator ~~(200)~~ comprises a controller for controlling the generation of the multi-channel signal ~~(202)~~ in the inactive frame using the comfort noise generation side information ~~(p_frame)~~ for the silence insertion descriptor frame ~~(241, 243)~~ to determine a comfort noise generation mode for the first channel ~~(201)~~ and the second channel ~~(203)~~, using the coherence information ~~(404, c)~~ in the silence insertion descriptor frame ~~(241)~~ to set a coherence ~~(404, c)~~ between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and using the comfort noise parameter data ~~(p_noise)~~ from the silence insertion descriptor frame ~~(241, 243)~~ for setting an energy situation ~~($v_{i,q}$)~~ of the first channel ~~(301)~~ and an energy situation ~~($v_{r,q}$)~~ of the second channel ~~(303)~~.

~~19~~22. Multi-channel signal generator as claimed in any of claims ~~12-18~~15-21,

wherein the encoded audio data ~~(232)~~ for the inactive frame comprises silence insertion descriptor data ~~(p_noise, c)~~ comprising comfort noise data ~~(c, p_noise)~~ indicating a signal energy for each channel in a mid/side representation and coherence data ~~(404, c)~~ indicating the coherence between the first channel and the second channel in the left/right representation, wherein the multi-channel signal generator is configured to convert the mid/side representation of the signal energy onto a left/right representation of the signal energy in the first channel ~~(301)~~ and the second channel ~~(303)~~,

wherein the mixer ~~(206, 220)~~ is configured to mix ~~(206-1, 206-3)~~ the mixing noise signal ~~(222)~~ to the first audio signal ~~(221)~~ and the second audio signal ~~(223)~~

based on the coherence data ~~(404, c)~~ to obtain the first channel ~~(201)~~ and the second channel ~~(203)~~, and

wherein the multi-channel signal generator further comprises a signal modifier ~~(250)~~ configured for modifying the first and second channel ~~(201, 203)~~ by shaping the first and second channel ~~(201, 203)~~ based on the signal energy in the left/right domain.

~~20~~23. Multi-channel signal generator as claimed in claim ~~19~~22, configured, in case the audio data contain signalling indicating that the energy in the side channel is smaller than a predetermined threshold, to zero ~~(337)~~ the coefficients of the side channel ~~($v_{s,q}$)~~.

~~21~~24. Multi-channel signal generator as claimed in claim ~~19~~22 or ~~20~~23, wherein the audio data for the inactive frame comprises:

at least one silence insertion descriptor frame ~~(241, 243)~~, wherein the at least one silence insertion descriptor frame ~~(241, 243)~~ comprises comfort noise parameter data ~~(p_noise, $v_{m,ind}$, $g_{l,q}$, $g_{r,q}$, $v_{s,ind}$)~~ for the mid and the side channel ~~($v_{m,q}$, $v_{s,q}$)~~ and comfort noise generation side information ~~(p_frame)~~ for the mid and the side channel ~~($v_{m,q}$, $v_{s,q}$)~~, and coherence information ~~(404, c)~~ indicating a coherence between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and

wherein the multi-channel signal generator ~~(200)~~ comprises a controller for controlling the generation of the multi-channel signal ~~(202)~~ in the inactive frame using the comfort noise generation side information ~~(p_frame)~~ for the silence insertion descriptor frame ~~(241, 243)~~ to determine a comfort noise generation mode for the first channel ~~(201)~~ and the second channel ~~(203)~~, using the coherence information ~~(404, c)~~ in the silence insertion descriptor frame ~~(241)~~ to set a coherence ~~(404, c)~~ between the first channel ~~(201)~~ and the second channel ~~(203)~~ in the inactive frame, and using the comfort noise parameter data ~~(p_noise)~~, or a processed version thereof, from the silence insertion descriptor frame ~~(241, 243)~~ for setting an energy situation ~~($v_{l,q}$)~~ of the first channel ~~(301)~~ and an energy situation ~~($v_{r,q}$)~~ of the second channel ~~(303)~~.

~~22~~25. Multi-channel signal generator as claimed in any of claims ~~12-21~~15-24, further configured to scale signal energy coefficients ~~(1312, v'_l, v'_r)~~ for the first and second channel by gain information ~~($g_{l,q}$, $g_{r,q}$)~~, encoded with the comfort noise parameter data ~~(401, 403)~~ for the first and second channel.

~~23~~26. Multi-channel signal generator as claimed in any of the preceding claims, configured to convert the generated multi-channel signal ~~(252)~~ from a frequency domain version to a time domain version.

~~24~~27. The channel signal generator claimed in any of the preceding claims, wherein the first audio source ~~(211)~~ is a first noise source and the first audio signal ~~(221)~~ is a first noise signal, or the second audio source ~~(213)~~ is a second noise source and the second audio signal ~~(223)~~ is a second noise signal,

wherein the first noise source or the second noise source is configured to generate the first noise signal ~~(201)~~ or the second noise signal ~~(203)~~ so that the first noise signal ~~(201)~~ or the second noise signal ~~(203)~~ are at least partially correlated, and

wherein the mixing noise source ~~(212)~~ is configured for generating the mixing noise signal ~~(222)~~ with a first mixing noise portion ~~(221a)~~ and a second mixing noise portion ~~(221b)~~, the second mixing noise portion ~~(221b)~~ being at least partially decorrelated from the first mixing noise portion ~~(221b)~~; and

wherein the mixer ~~(206)~~ is configured for mixing the first mixing noise portion ~~(221a)~~ of the mixing noise signal ~~(222)~~ and the first audio signal ~~(221)~~ to obtain the first channel ~~(201)~~ and for mixing the second mixing noise portion ~~(221b)~~ of the mixing noise signal ~~(222)~~ and the second audio signal ~~(223)~~ to obtain the second channel ~~(203)~~.

28. Multi-channel signal generator for generating a multi-channel signal having a first channel and a second channel, comprising:

a first audio source for generating a first audio signal;

a second audio source for generating a second audio signal;

a mixing noise source for generating a mixing noise signal; and

a mixer for mixing the mixing noise signal and the first audio signal to obtain the first channel and for mixing the mixing noise signal and the second audio signal to obtain the second channel,

wherein the first audio source is a first noise source and the first audio signal is a first noise signal, or the second audio source is a second noise source and the second audio signal is a second noise signal,

wherein the first noise source or the second noise source is configured to generate the first noise signal or the second noise signal so that the first noise signal or the second noise signal are at least partially correlated, and

wherein the mixing noise source is configured for generating the mixing noise signal with a first mixing noise portion and a second mixing noise portion, the second mixing noise portion being at least partially decorrelated from the first mixing noise portion; and

wherein the mixer is configured for mixing the first mixing noise portion of the mixing noise signal and the first audio signal to obtain the first channel and for mixing the second mixing noise portion of the mixing noise signal and the second audio signal to obtain the second channel.

~~25~~29. Method of generating a multi-channel signal having a first channel and a second channel ~~(203)~~, comprising:

generating a first audio signal ~~(221)~~ using a first audio source ~~(211)~~;

generating a second audio signal ~~(223)~~ using a second audio source ~~(213)~~;

generating a mixing noise signal ~~(222)~~ using a mixing noise source ~~(212)~~; and

mixing ~~(206)~~ the mixing noise signal ~~(222)~~ and the first audio signal ~~(221)~~ to obtain the first channel ~~(201)~~ and mixing the mixing noise signal ~~(222)~~ and the second audio signal ~~(223)~~ to obtain the second channel ~~(202).~~, the method comprising:

using a first amplitude element influencing an amplitude of the first audio signal;

using a first adder adding an output signal of the first amplitude element and at least a portion of the mixing noise signal;

using a second amplitude element influencing an amplitude of the second audio signal;

using a second adder adding an output of the second amplitude element and at least a portion of the mixing noise signal,

wherein an amount of influencing performed by the first amplitude element and an amount of influencing performed by the second amplitude element are equal to each other or the amount of influencing performed by the second amplitude element is different by less than 20 percent of the amount performed by the first amplitude element,

wherein mixing uses a third amplitude element influencing an amplitude of the mixing noise signal,

wherein an amount of influencing performed by the third amplitude element depends on the amount of influencing performed by the first amplitude element or the second amplitude element, so that the amount of influencing performed by the third amplitude element becomes greater when the amount of influencing performed by the first amplitude element or the amount of influencing performed by the second amplitude element becomes smaller.

~~26~~30. Audio encoder ~~(300, 300a, 300b)~~ for generating an encoded multi-channel audio signal ~~(232)~~ for a sequence of frames comprising an active frame ~~(306)~~ and an inactive frame ~~(308)~~, the audio encoder comprising:

an activity detector ~~(380)~~ for analyzing a multi-channel signal ~~(304)~~ to determine ~~(381)~~ a frame of the sequence of frames to be an inactive frame ~~(308)~~;

a noise parameter calculator ~~(3040)~~ for calculating first parametric noise data ~~(p_noise, $v_{m, ind}$)~~ for a first channel ~~(301, 201)~~ of the multi-channel signal ~~(304)~~, and for calculating second parametric noise data ~~(p_noise, $v_{s, ind}$)~~ for a second channel ~~(303)~~ of the multi-channel signal ~~(320)~~;

a coherence calculator ~~(320)~~ for calculating coherence data ~~(404, c)~~ indicating a coherence situation between the first channel ~~(301, 201)~~ and the second channel ~~(303, 203)~~ in the inactive frame ~~(308)~~; and

~~an output interface (310)~~ for generating the encoded multi-channel audio signal ~~(232)~~ having encoded audio data for the active frame ~~(306)~~ and, for the inactive frame ~~(308)~~, the first parametric noise data ~~(p_noise, $v_{m, ind}$)~~, the second parametric noise data ~~(p_noise, $v_{s, ind}$)~~, and/or a first linear combination of the first parametric noise data and the second parametric noise data and second linear combination of the first parametric noise data and the second parametric noise data, and the coherence data ~~(c, 404).~~,wherein the noise parameter calculator is configured to convert at least some of the first parametric noise data and second parametric noise data from a left/right representation to a mid/side representation with a mid channel and a side channel.

31. Audio encoder as claimed in claim 30, wherein the noise parameter calculator ~~(3040)~~ is configured to reconvert the mid/side representation ~~(M, S)~~ of at least some of the first parametric noise data and second parametric noise data onto a left/right representation,

wherein the noise parameter calculator (3040) is configured to calculate, from the reconverted left/right representation, a first gain information (g_l) for the first channel (301) and second gain information (g_r) for the second channel (303), and to provide, included in the first parametric noise data, the first gain information (g_l) for the first channel (301), and, included in the second parametric noise data, the second gain information (g_r).

32. Audio encoder as claimed in claim 31, wherein the noise parameter calculator (3040) is configured to calculate:

the first gain information (g_l) by comparing:

a version (v'_l) of the first parametric noise data for the first channel (301) as reconverted from the mid/side representation to the left/right representation; with

a version (v_l) of the first parametric noise data for the first channel (301) before being converted from the mid/side representation to the left/right representation; and/or

the second gain information (g_r) by comparing:

a version (v'_r) of the second parametric noise data for the second channel (301) as reconverted from the mid/side representation to the left/right representation; with

a version (v_r) of the second parametric noise data for the second channel (301) before being converted from the mid/side representation to the left/right representation.

2733. Audio encoder as claimed in claim 26 for generating an encoded multi-channel audio signal for a sequence of frames comprising an active frame and an inactive frame, the audio encoder comprising:

an activity detector for analyzing a multi-channel signal to determine a frame of the sequence of frames to be an inactive frame;

a noise parameter calculator for calculating first parametric noise data for a first channel of the multi-channel signal, and for calculating second parametric noise data for a second channel of the multi-channel signal;

wherein thea coherence calculator (320) is configured to calculate (320') afor calculating coherence valuedata (404, c) and to quantize (320") theindicating a coherence value (320') to obtain a quantized coherence value (c_{ind}), wherein thesituation between the first channel and the second channel in the inactive frame; and

an output interface ~~(310) is configured to use the quantized coherence value (c_{ind}) as the coherence data in~~for generating the encoded multi-channel audio signal~~.~~ having encoded audio data for the active frame and, for the inactive frame, the first parametric noise data, the second parametric noise data, and/or a first linear combination of the first parametric noise data and the second parametric noise data and second linear combination of the first parametric noise data and the second parametric noise data, and the coherence data,

~~28. Audio encoder claimed in claim 26 or 27,~~ wherein the coherence calculator ~~(320)~~ is configured:

to calculate a real intermediate value and an imaginary intermediate value from complex spectral values for the first channel and the second channel ~~(303)~~ in the inactive frame;

to calculate a first energy value for the first channel ~~(301)~~ and a second energy value for the second channel ~~(303)~~ in the inactive frame; and

to calculate the coherence data ~~(404, c)~~ using the real intermediate value, the imaginary intermediate value, the first energy value and the second energy value, or

to smooth at least one of the real intermediate value, the imaginary intermediate value, the first energy value and the second energy value, and to calculate the coherence data using at least one smoothed value~~.~~,

wherein the coherence calculator ~~(320)~~ is configured to square a smoothed real intermediate value and to square a smoothed imaginary intermediate value and to add the squared values to obtain a first component number,

wherein the coherence calculator ~~(320)~~ is configured to multiply the smoothed first and second energy values to obtain a second component number, and to combine the first and the second component numbers to obtain a result number for the coherence value, on which the coherence data is based.

34. Audio encoder for generating an encoded multi-channel audio signal for a sequence of frames comprising an active frame and an inactive frame, the audio encoder comprising:

an activity detector for analyzing a multi-channel signal to determine a frame of the sequence of frames to be an inactive frame;

a noise parameter calculator for calculating first parametric noise data for a first channel of the multi-channel signal, and for calculating second parametric noise data for a second channel of the multi-channel signal;

a coherence calculator for calculating coherence data indicating a coherence situation between the first channel and the second channel in the inactive frame; and

an output interface for generating the encoded multi-channel audio signal having encoded audio data for the active frame and, for the inactive frame, the first parametric noise data, the second parametric noise data, and/or a first linear combination of the first parametric noise data and the second parametric noise data and second linear combination of the first parametric noise data and the second parametric noise data, and the coherence data,

wherein the noise parameter calculator ~~(3040)~~ is configured for comparing an energy of the second linear combination between the first parametric noise data and the second parametric noise data with a predetermined energy threshold ~~(α)~~, and:

in case the energy of the second linear combination between the first parametric noise data and the second parametric noise data is greater than the predetermined energy threshold ~~(α)~~, the coefficients of the side channel noise shape vector are zeroed ~~(437)~~; and

in case the energy of the second linear combination between the first parametric noise data and the second parametric noise data is smaller than the predetermined energy threshold ~~(α)~~, the coefficients of the side channel noise shape vector are maintained.

35. Audio encoder as claimed in any of claims 30-34, wherein the coherence calculator is configured to calculate a coherence value and to quantize the coherence value to obtain a quantized coherence value, wherein the output interface is configured to use the quantized coherence value as the coherence data in the encoded multi-channel signal.

~~29~~36. Audio encoder of any of claim~~s 28~~30-35,

wherein the coherence calculator ~~(320)~~ is configured to calculate the real intermediate value as a sum over real parts of products of complex spectral values for corresponding frequency bins of the first channel and the second channel ~~(303)~~ in the inactive frame, or

to calculate the imaginary intermediate value as a sum over imaginary parts of products of the complex spectral values for corresponding frequency bins of the first channel ~~(303)~~ in the inactive frame.

~~30. Audio encoder of claim 28 or 29,~~

~~wherein the coherence calculator (320) is configured to square a smoothed real intermediate value and to square a smoothed imaginary intermediate value and to add the squared values to obtain a first component number,~~

~~wherein the coherence calculator (320) is configured to multiply the smoothed first and second energy values to obtain a second component number, and to combine the first and the second component numbers to obtain a result number for the coherence value, on which the coherence data is based.~~

~~31~~37. Audio encoder as claimed in claim ~~30~~33, wherein the coherence calculator is configured to calculate a square root of the result number to obtain a coherence value on which the coherence data is based.

~~32~~38. Audio encoder as claimed in one of claims ~~27~~30 to ~~31~~37,

wherein the coherence calculator ~~(320)~~ is configured to quantize the coherence value ~~(404, c)~~ using a uniform quantizer ~~(320")~~ to obtain the quantized coherence value ~~(c_{ind})~~ as an n bit number as the coherence data.

39. Audio encoder as claimed in claim 38, wherein the uniform quantizer is configured to calculate an n bit number so that the value for n is equal to a value of bits occupied by the comfort noise generation side information for the first silence insertion descriptor frame.

~~33~~40. Audio encoder as claimed in one of claims ~~26-32~~30-39, wherein the output interface ~~(310)~~ is configured to generate a first silence insertion descriptor frame ~~(241)~~ for the first channel ~~(301, L)~~ and a second silence insertion descriptor frame ~~(243)~~ for the second channel ~~(303, R)~~, wherein the first silence insertion descriptor frame ~~(241)~~ comprises comfort noise parameter data ~~(p_noise)~~ for the first channel ~~(301, L)~~ and comfort noise generation side information ~~(p_frame)~~ for the first channel ~~(301, L)~~ and the second channel ~~(303, R)~~, and wherein the second silence insertion descriptor

frame ~~(243)~~ comprises comfort noise parameter data ~~(p_noise)~~ for the second channel ~~(303)~~ and coherence information ~~(404, c)~~ indicating a coherence between the first channel and the second channel ~~(303)~~ in the inactive frame.~~, or~~

41. Audio encoder as claimed in one of claims 30-39,

wherein the output interface ~~(310)~~ is configured to generate a silence insertion descriptor frame ~~(241, 243)~~, wherein the silence insertion descriptor frame comprises comfort noise parameter data ~~(p_noise)~~ for the first and the second channel ~~(301, 303)~~ and comfort noise generation side information ~~(p_frame)~~ for the first channel ~~(301, L)~~ and the second channel ~~(303, R)~~, and coherence information ~~(404, c)~~ indicating a coherence between the first channel ~~(301, L)~~ and the second channel ~~(303, R)~~ in the inactive frame~~, or~~.

42. Audio encoder as claimed in one of claims 30-39,

wherein the output interface ~~(310)~~ is configured to generate a first silence insertion descriptor frame ~~(241)~~ for the first channel ~~(301, L)~~ and the second channel, and a second silence insertion descriptor frame ~~(243)~~ for the first channel and the second channel ~~(303, R)~~, wherein the first silence insertion descriptor frame ~~(241)~~ comprises comfort noise parameter data ~~(p_noise)~~ for the first channel and the second channel and comfort noise generation side information ~~(p_frame)~~ for the first channel ~~(301, L)~~ and the second channel ~~(303, R)~~, and wherein the second silence insertion descriptor frame ~~(243)~~ comprises comfort noise parameter data ~~(p_noise)~~ for the first channel and the second channel ~~(303)~~ and coherence information ~~(404, c)~~ indicating a coherence between the first channel and the second channel ~~(303)~~ in the inactive frame.

~~34. Audio encoder as claimed in claim 32 or claim 33, wherein the uniform quantizer (320") is configured to calculate an n bit number so that the value for n is equal to a value of bits occupied by the comfort noise generation side information (p_frame) for the first silence insertion descriptor frame (241).~~

~~35~~43. Audio encoder ~~(300)~~ as claimed in one of claims ~~26~~30 to ~~34~~42, wherein the activity detector ~~(380)~~ is configured, for at least one frame of the sequence of frames, to

analyze ~~(370-1)~~ the first channel ~~(301, L)~~ of the multi-channel signal ~~(304)~~ to classify the first channel ~~(301, L)~~ as active or inactive, and

analyze ~~(370-2)~~ the second channel ~~(303, R)~~ of the multi-channel signal ~~(304)~~ to classify the second channel ~~(303, R)~~ as active or inactive, and

determine ~~(381)~~ the frame to be inactive if both the first channel ~~(301, L)~~ and the second channel ~~(303, R)~~ are classified as inactive, and otherwise active.

~~36~~44. Audio encoder ~~(300)~~ as claimed in one of claims ~~26~~30 to ~~35~~43, wherein the noise parameter calculator ~~(3040)~~ is configured for calculating first gain information ~~(g_f)~~ for the first channel ~~(301)~~ and second gain information ~~(g_s)~~ for the second channel ~~(g_f)~~, and to provide parametric noise data as first gain information ~~(g_f)~~ for the first channel ~~(301)~~ and second gain information ~~(g_s)~~.

~~37. Audio encoder (300) as claimed in one of claims 26 to 36, wherein the noise parameter calculator (3040) is configured to convert at least some of the first parametric noise data and second parametric noise data from a left/right representation to a mid/side representation with a mid channel and a side channel.~~

~~38. Audio encoder as claimed in claim 37, wherein the noise parameter calculator (3040) is configured to reconvert the mid/side representation (M, S) of at least some of the first parametric noise data and second parametric noise data onto a left/right representation,~~

~~wherein the noise parameter calculator (3040) is configured to calculate, from the reconverted left/right representation, a first gain information (g_f) for the first channel (301) and second gain information (g_s) for the second channel (303), and to provide, included in the first parametric noise data, the first gain information (g_f) for the first channel (301), and, included in the second parametric noise data, the second gain information (g_s).~~

~~39. Audio encoder (300) as claimed in claim 38, wherein the noise parameter calculator (3040) is configured to calculate:~~

~~the first gain information (g_f) by comparing:~~

~~a version (v'_f) of the first parametric noise data for the first channel (301) as reconverted from the mid/side representation to the left/right representation; with~~

~~a version (v_f) of the first parametric noise data for the first channel (301) before being converted from the mid/side representation to the left/right representation; and/or~~

~~the second gain information (g_r) by comparing:~~

~~a version (v'_r) of the second parametric noise data for the second channel (301) as reconverted from the mid/side representation to the left/right representation; with~~

~~a version (v_r) of the second parametric noise data for the second channel (301) before being converted from the mid/side representation to the left/right representation.~~

~~40. Audio encoder as claimed in one of claims 26 to 39, wherein the noise parameter calculator (3040) is configured for comparing an energy of the second linear combination between the first parametric noise data and the second parametric noise data with a predetermined energy threshold (α), and:~~

~~in case the energy of the second linear combination between the first parametric noise data and the second parametric noise data is greater than the predetermined energy threshold (α), the coefficients of the side channel noise shape vector are zeroed (437); and~~

~~in case the energy of the second linear combination between the first parametric noise data and the second parametric noise data is smaller than the predetermined energy threshold (α), the coefficients of the side channel noise shape vector are maintained.~~

~~41~~45. Audio encoder ~~(300)~~ as claimed in one of claims ~~26~~30 to ~~44~~40, configured to encode the second linear combination between the first parametric noise data and the second parametric noise data with a smaller amount of bits than an amount of bit through which the first linear combination between the first parametric noise data and the second parametric noise data is encoded.

~~42~~46. Audio encoder as claimed in one of claims ~~26~~30 to ~~41~~45,

wherein the output interface ~~(310)~~ is configured:

to generate the encoded multi-channel audio signal ~~(232)~~ having encoded audio data for the active frame ~~(306)~~ using a first plurality of coefficients for a first number of frequency bins; and

to generate the first parametric noise data, the second parametric noise data, or the first linear combination of the first parametric noise data and the second parametric noise data and second linear combination of the first parametric noise data

and the second parametric noise data using a second plurality of coefficients describing a second number of frequency bins,

wherein the first number of frequency bins is greater than the second number of frequency bins.

~~43~~47. Method of audio encoding for generating an encoded multi-channel audio signal for a sequence of frames comprising an active frame and an inactive frame, the method comprising:

analyzing a multi-channel signal to determine a frame of the sequence of frames to be an inactive frame;

calculating first parametric noise data for a first channel of the multi-channel signal, and/or for a first linear combination of a first and second channels of the multi-channel signal, and calculating second parametric noise data for a second channel ~~(303)~~ of the multi-channel signal, and/or for a second linear combination of the first and second channels of the multi-channel signal;

calculating coherence data indicating a coherence situation between the first channel and the second channel ~~(303)~~ in the inactive frame; and

generating the encoded multi-channel audio signal having encoded audio data for the active frame and, for the inactive frame, the first parametric noise data, the second parametric noise data, and the coherence data~~.~~,

wherein the noise parameter calculator is configured to convert at least some of the first parametric noise data and second parametric noise data from a left/right representation to a mid/side representation with a mid channel and a side channel.

~~44~~48. Computer program for performing, when running on a computer or a processor, the method of claim ~~25~~29 or the method of claim ~~43~~47.

~~45~~49. Encoded multi-channel audio signal organized in a sequence of frames, the sequence of frames comprising an active frame and an inactive frame, the encoded multi-channel audio signal comprising:

encoded audio data for the active frame;

first parametric noise data for a first channel in the inactive frame;

second parametric noise data for a second channel ~~(303)~~ in the inactive frame; and

coherence data indicating a coherence situation between the first channel and the second channel ~~(303)~~ in the inactive frame.