Claims

1. An apparatus for generating an audio output signal based on an encoded audio signal spectrum, wherein the apparatus comprises:

a processing unit (115) for processing the encoded audio signal spectrum to obtain a decoded audio signal spectrum comprising a plurality of spectral coefficients, wherein each of the spectral coefficients has a spectral location within the encoded audio signal spectrum and a spectral value, wherein the spectral coefficients are sequentially ordered according to their spectral location within the encoded audio signal spectrum so that the spectral coefficients form a sequence of spectral coefficients,

a pseudo coefficients determiner (125) for determining one or more pseudo coefficients of the decoded audio signal spectrum, wherein each of the pseudo coefficients is one of the spectral coefficients,

a replacement unit (135) for replacing a pseudo coefficient and at least one of a predecessor and a successor of the pseudo coefficient, having a spectral value being a predefined value which is different from the spectral value of the pseudo coefficient, by a determined spectral pattern to obtain a modified audio signal spectrum, wherein the determined spectral pattern comprises at least two pattern coefficients, wherein each of the at least two pattern coefficients has a spectral value, and

a spectrum-time-conversion unit (145) for converting the modified audio signal spectrum to a time-domain to obtain the audio output signal.

2. An apparatus according to claim 1,

wherein the apparatus furthermore comprises a storage unit (155) comprising a database or a memory having stored within the database or within the memory a plurality of stored spectral patterns, wherein each of the stored spectral patterns has a spectral property,

wherein the replacement unit (135) is configured to request one of the stored spectral patterns from the storage unit (155) as a requested spectral pattern,

wherein the storage unit (155) is configured to provide the requested spectral pattern, and

wherein the replacement unit (135) is configured to replace said pseudo coefficient by the determined spectral pattern based on the requested spectral pattern.

3. An apparatus according to claim 2, wherein the replacement unit (135) is configured to request said one of the stored spectral patterns from the storage unit (155) depending on a first derived spectral location derived from at least one of the one or more pseudo coefficients determined by the pseudo coefficients determiner (125).

4. An apparatus according to claim 3,

wherein the one or more pseudo coefficients are signed values, each comprising a sign component, and

wherein the replacement unit (135) is configured to determine the first derived spectral location based on the spectral location of one pseudo coefficient of the one or more pseudo coefficients and based on the sign component of said pseudo coefficient, so that the first derived spectral location is equal to the spectral location of said pseudo coefficient when the sign component has a first sign value, and so that the first derived spectral location is equal to a modified location, the modified location resulting from shifting the spectral location of said pseudo coefficient by the predefined value when the sign component has a different second value.

5. An apparatus according to claim 3 or 4,

wherein the plurality of stored spectral patterns being stored within the database or the memory of the storage unit (155) are either stationary tone patterns or frequency sweep patterns,

wherein the pseudo coefficients determiner (125) is configured to determine two or more temporally consecutive pseudo coefficients of the decoded audio signal spectrum,

wherein the replacement unit (135) is configured to assign a first pseudo coefficient and a second pseudo coefficient of the two or more temporally consecutive pseudo

coefficients to a track depending on whether an absolute difference between the first derived spectral location derived from the first pseudo coefficient and a second derived spectral location derived from the second pseudo coefficient is smaller than a threshold value, and

wherein the replacement unit (135) is configured to request one of the stationary tone patterns from the storage unit (155) when the first derived spectral location derived from the first pseudo coefficient of the track is equal to the second derived spectral location derived from the second pseudo coefficient of the track, and wherein the replacement unit (135) is configured to request one of the frequency sweep patterns from the storage unit (155) when the first derived spectral location derived from the first pseudo coefficient of the track is different from the second derived spectral location derived from the second pseudo coefficient of the track.

6. An apparatus according to claim 5,

wherein the predefined value is a first predefined value, and

wherein the replacement unit (135) is configured to request a first frequency sweep pattern of the frequency sweep patterns from the storage unit (155) when a frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived from the first pseudo coefficient of the track is equal to half of a second predefined value,

wherein the replacement unit (135) is configured to request a second frequency sweep pattern, being different from the first frequency sweep pattern, of the frequency sweep patterns from the storage unit (155) when the frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived from the first pseudo coefficient of the track is equal to the second predefined value, and

wherein the replacement unit (135) is configured to request a third frequency sweep pattern, being different from the first sweep pattern and the second frequency sweep pattern, of the frequency sweep patterns from the storage unit (155) when the frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived

from the first pseudo coefficient of the track is equal to one and a half times the second predefined value.

7. An apparatus according to one of claims 2 to 6, wherein the replacement unit (135) comprises a pattern adaptation unit (138) being configured to modify the requested spectral pattern provided by the storage unit (155) to obtain the determined spectral pattern.

8. An apparatus according to claim 7, wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern provided by the storage unit (155) by rescaling the spectral values of the pattern coefficients of the requested spectral pattern depending on the spectral value of one of the one or more pseudo coefficients

9. An apparatus according to claim 7 or 8, wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern provided by the storage unit (155) depending on a start phase so that the spectral value of each of the pattern coefficients of the requested spectral pattern is modified in a first way, when the start phase has a first start phase value, and so that the spectral value of each of the pattern coefficients of the requested spectral pattern is modified in a different second way, when the start phase has a different second start phase value.

10. An apparatus according to one of claims 7 to 9,

wherein the spectral value of each of the pattern coefficients of the requested spectral pattern is a complex coefficient comprising a real part and an imaginary part, and

wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern by modifying the real part and the imaginary part of each of the pattern coefficients of the requested spectral pattern provided by the storage unit (155) by applying a complex rotation factor $e^{i\cdot\varphi}$, wherein φ is an angle value.

11. An apparatus according to one of claims 7 to 9,

wherein the spectral value of each of the pattern coefficients of the requested spectral pattern is a complex coefficient comprising a real part and an imaginary part, and

wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern provided by the storage unit (155) by negating the real and the imaginary part of the spectral value of each of the pattern coefficients of the requested spectral pattern, or by swapping the real part or a negated real part and the imaginary part or a negated imaginary part of the spectral value of each of the pattern coefficients of the requested spectral pattern.

12. An apparatus according to one of claims 7 to 11, wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern provided by the storage unit (155) by realizing a temporal mirroring of the pattern by computing the complex conjugate of the pattern and applying a complex phase term.

13. An apparatus according to one of claims 7 to 12,

wherein the decoded audio signal spectrum is represented in an MDCT domain,

wherein the pattern adaptation unit (138) is configured to modify the requested spectral pattern provided by the storage unit (155) by modifying the spectral values of the pattern coefficients of the requested spectral pattern to obtain a modified spectral pattern, wherein the spectral values are represented in an Oddly-Stacked Discrete Fourier Transform domain,

wherein the pattern adaptation unit (135) is configured to transform the spectral values of the pattern coefficients of the modified spectral pattern from the Oddly-Stacked Discrete Fourier Transform domain to the MDCT domain to obtain the determined spectral pattern, and

wherein the replacement unit (135) is configured to replace said pseudo coefficient by the determined spectral pattern being represented in the MDCT domain to obtain the modified audio signal spectrum being represented in the MDCT domain.

14. An apparatus for generating a plurality of spectral patterns, comprising:

a signal generator (165) for generating a plurality of signals in a first domain,

a signal transformation unit (175) for transforming each signal of the plurality of signals from the first domain to a second domain to obtain a plurality of spectral

patterns, each pattern of the plurality of transformed spectral patterns comprising a plurality of coefficients,

a postprocessing unit (185) for truncating the transformed spectral patterns by removing one or more of the coefficients of the transformed spectral patterns to obtain a plurality of processed patterns, and

a storage unit (195) comprising a database or a memory, wherein the storage unit (195) is configured to store each processed pattern of the plurality of processed patterns in the database or the memory,

wherein the signal generator (165) is configured to generate each signal of the plurality of signals based on the formulae

$$x(t) = cos\,(2\pi\varphi(t))$$

and

$$\varphi(t) = \varphi(0) + \int_0^t 2\pi f(\tau)d\tau \quad ,$$

wherein t and τ indicate time,

wherein φ(t) is an instantaneous phase at t, and

wherein f(τ) is an instantaneous frequency at τ,

wherein each signal of the plurality of signals has a start frequency (f_0), being an instantaneous frequency of said signal at a first point-in-time, and a target frequency (f_1), being an instantaneous frequency of said signal at a different second point-in-time,

wherein the signal generator (165) is configured to generate a first signal of the plurality of signals so that the target frequency of the first signal is equal to the start frequency, and

wherein the signal generator (165) is configured to generate a different second signal of the plurality of signals so that the target frequency of the first signal is different from the start frequency.

15. An apparatus according to claim 14,

wherein the signal transformation unit (175) is configured to transform each signal of the plurality of signals from the first domain, being a time domain, to a second domain, being a spectral domain,

wherein the signal transformation unit (175) is configured to generate a first one of a plurality of time blocks for transforming said signal,

wherein each time block of the plurality of time blocks comprises a plurality of weighted samples, wherein each of said weighted samples is a signal sample of said signal being weighted by a weight of a plurality of weights, wherein the plurality of weights are assigned to said time block, and wherein each weight of the plurality of weights is assigned to a point-in-time,

wherein the start frequency (f_0) of each signal of the plurality of signals is an instantaneous frequency of said signal at the first point-in-time, where a first one of the weights of the first one of the time blocks is assigned to the first point-in-time, where a second one of the weights of a different second one of the time blocks is assigned to the first point-in-time, wherein the first one of the time blocks and the second one of the time blocks overlap, and wherein the first one of the weights is equal to the second one of the weights, and

wherein the target frequency (f_1) of each signal of the plurality of signals is an instantaneous frequency of said signal at the second point-in-time, where a third one of the weights of the first one of the time blocks is assigned to the second point-in-time, where a fourth one of the weights of a different third one of the time blocks, is assigned to the second point-in-time, wherein the first one of the time blocks and the third one of the time blocks overlap, and wherein the third one of the weights is equal to the fourth one of the weights.

16. An apparatus according to claim 14 or 15,

wherein each signal of the plurality of signals has a start phase (φ_0), being a phase of said signal at a first point-in-time,

wherein the signal generator (165) is configured to generate the plurality of signals such that the start phase (φ_0) of a first one of the plurality signals is equal to the start phase (φ_0) of a different second one of the plurality of the signals.

17. An apparatus according to one of claims 14 to 16, wherein the postprocessing unit (185) is furthermore configured to conduct a rotation by an arbitrary phase angle on the spectral coefficients of each of the transformed spectral patterns to obtain a plurality of arbitrarily rotated spectral patterns.

18. An apparatus according to one of claims 14 to 16, wherein the postprocessing unit (185) is furthermore configured to conduct a rotation by $\pi/4$ on the spectral coefficients of each of the transformed spectral patterns to obtain a plurality of rotated spectral patterns.

19. An apparatus according to one of claims 14 to 18, wherein the signal generator (165) is configured to generate the first signal, the second signal and one or more further signals as the plurality of signals, so that each difference of the target frequency and the start frequency of each of the further signals is an integer multiple of a difference of the target frequency and the start frequency of the second signal.

20. A method for generating an audio output signal based on an encoded audio signal spectrum, wherein the method comprises:

processing the encoded audio signal spectrum to obtain a decoded audio signal spectrum comprising a plurality of spectral coefficients, wherein each of the spectral coefficients has a spectral location within the encoded audio signal spectrum and a spectral value, wherein the spectral coefficients are sequentially ordered according to their spectral location within the encoded audio signal spectrum so that the spectral coefficients form a sequence of spectral coefficients,

determining one or more pseudo coefficients of the decoded audio signal spectrum, wherein each of the pseudo coefficients is one of the spectral coefficients,

replacing a pseudo coefficient and at least one of a predecessor and a successor of the pseudo coefficient, having a spectral value being a predefined value which is different from the spectral value of the pseudo coefficient, by a determined spectral pattern to obtain a modified audio signal spectrum, wherein the determined spectral pattern comprises at least two pattern coefficients, wherein each of the at least two pattern coefficients has a spectral value, and

converting the modified audio signal spectrum to a time-domain to obtain the audio output signal.

21. A method for generating a plurality of spectral patterns, comprising:

generating a plurality of signals in a first domain,

transforming each signal of the plurality of signals from the first domain to a second domain to obtain a plurality of spectral patterns, each pattern of the plurality of transformed spectral patterns comprising a plurality of coefficients,

truncating the transformed spectral patterns by removing one or more of the coefficients of the transformed spectral patterns to obtain a plurality of processed patterns, and

storing each processed pattern of the plurality of processed patterns in a database or a memory,

wherein generating each signal of the plurality of signals is conducted based on the formulae

$$x(t) = cos\,(2\pi\varphi(t))$$

and

$$\varphi(t) = \varphi(0) + \int_0^t 2\pi f(\tau)d\tau$$

,

wherein t and τ indicate time,

wherein φ(t) is an instantaneous phase at t, and

wherein $f(\tau)$ is an instantaneous frequency at τ,

wherein each signal of the plurality of signals has a start frequency (f_0), being an instantaneous frequency of said signal at a first point-in-time, and a target frequency (f_1), being an instantaneous frequency of said signal at a different second point-in-time,

wherein generating the plurality of signals is conducted by generating a first signal of the plurality of signals so that the target frequency (f_1) of the first signal is equal to the start frequency (f_0), and

wherein generating the plurality of signals is conducted by generating a different second signal of the plurality of signals so that the target frequency (f_1) of the first signal is different from the start frequency (f_0).

22. A computer program for implementing the method of claim 20 or 21 when being executed on a computer or signal processor.

Claims

1. An apparatus for generating an audio output signal based on an encoded audio signal spectrum, wherein the apparatus comprises:

a processing unit for processing the encoded audio signal spectrum to obtain a decoded audio signal spectrum comprising a plurality of spectral coefficients, wherein each of the spectral coefficients has a spectral location within the encoded audio signal spectrum and a spectral value, wherein the spectral coefficients are sequentially ordered according to their spectral location within the encoded audio signal spectrum so that the spectral coefficients form a sequence of spectral coefficients,

a pseudo coefficients determiner for determining one or more pseudo coefficients of the decoded audio signal spectrum, wherein each of the pseudo coefficients is one of the spectral coefficients,

a replacement unit for replacing at least one or more pseudo coefficients by a determined spectral pattern to obtain a modified audio signal spectrum, wherein the determined spectral pattern comprises at least two pattern coefficients, wherein each of the at least two pattern coefficients has a spectral value, and

a spectrum-time-conversion unit for converting the modified audio signal spectrum to a time-domain to obtain the audio output signal.

2. An apparatus according to claim 1,

wherein the apparatus furthermore comprises a storage unit comprising a database or a memory having stored within the database or within the memory a plurality of stored spectral patterns, wherein each of the stored spectral patterns has a spectral property,

wherein the replacement unit is configured to request one of the stored spectral patterns from the storage unit as a requested spectral pattern,

wherein the storage unit is configured to provide the requested spectral pattern, and

wherein the replacement unit is configured to replace the at least one or more pseudo coefficients by the determined spectral pattern based on the requested spectral pattern.

3. An apparatus according to claim 2, wherein the replacement unit is configured to request said one of the stored spectral patterns from the storage unit depending on a first derived spectral location derived from at least one of the one or more pseudo coefficients determined by the pseudo coefficients determiner.

4. An apparatus according to claim 3,

wherein the one or more pseudo coefficients are signed values, each comprising a sign component, and

wherein the replacement unit is configured to determine the first derived spectral location based on the spectral location of one pseudo coefficient of the one or more pseudo coefficients and based on the sign component of said pseudo coefficient, so that the first derived spectral location is equal to the spectral location of said pseudo coefficient when the sign component has a first sign value, and so that the first derived spectral location is equal to a modified location, the modified location resulting from shifting the spectral location of said pseudo coefficient by a predefined value when the sign component has a different second value.

5. An apparatus according to claim 3 or 4,

wherein the plurality of stored spectral patterns being stored within the database or the memory of the storage unit are either stationary tone patterns or frequency sweep patterns,

wherein the pseudo coefficients determiner is configured to determine two or more temporally consecutive pseudo coefficients of the decoded audio signal spectrum,

wherein the replacement unit is configured to assign a first pseudo coefficient and a second pseudo coefficient of the two or more temporally consecutive pseudo coefficients to a track depending on whether an absolute difference between the first derived spectral location derived from the first pseudo coefficient and a second derived spectral location derived from the second pseudo coefficient is smaller than a threshold value, and

wherein the replacement unit is configured to request one of the stationary tone patterns from the storage unit when the first derived spectral location derived from the first pseudo coefficient of the track is equal to the second derived spectral location derived from the second pseudo coefficient of the track, and wherein the replacement unit is configured to request one of the frequency sweep patterns from the storage unit when the first derived spectral location derived from the first pseudo coefficient of the track is different from the second derived spectral location derived from the second pseudo coefficient of the track.

6. An apparatus according to claim 5,

wherein the replacement unit is configured to request a first frequency sweep pattern of the frequency sweep patterns from the storage unit when a frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived from the first pseudo coefficient of the track is equal to half of a predefined value,

wherein the replacement unit is configured to request a second frequency sweep pattern, being different from the first frequency sweep pattern, of the frequency sweep patterns from the storage unit when the frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived from the first pseudo coefficient of the track is equal to the predefined value, and

wherein the replacement unit is configured to request a third frequency sweep pattern, being different from the first sweep pattern and the second frequency sweep pattern, of the frequency sweep patterns from the storage unit when the frequency difference between the second derived spectral location derived from the second pseudo coefficient of the track and the first derived spectral location derived from the first pseudo coefficient of the track is equal to one and a half times the predefined value.

7. An apparatus according to one of claims 2 to 6, wherein the replacement unit comprises a pattern adaptation unit being configured to modify the requested spectral pattern provided by the storage unit to obtain the determined spectral pattern.

8. An apparatus according to claim 7, wherein the pattern adaptation unit is configured to modify the requested spectral pattern provided by the storage unit by rescaling the spectral values of the pattern coefficients of the requested spectral pattern depending on the spectral value of one of the one or more pseudo coefficients

9. An apparatus according to claim 7 or 8, wherein the pattern adaptation unit is configured to modify the requested spectral pattern provided by the storage unit depending on a start phase so that the spectral value of each of the pattern coefficients of the requested spectral pattern is modified in a first way, when the start phase has a first start phase value, and so that the spectral value of each of the pattern coefficients of the requested spectral pattern is modified in a different second way, when the start phase has a different second start phase value.

10. An apparatus according to one of claims 7 to 9,

wherein the spectral value of each of the pattern coefficients of the requested spectral pattern is a complex coefficient comprising a real part and an imaginary part, and

wherein the pattern adaptation unit is configured to modify the requested spectral pattern by modifying the real part and the imaginary part of each of the pattern coefficients of the requested spectral pattern provided by the storage unit by applying a complex rotation factor $e^{j\cdot\varphi}$, wherein φ is an angle value.

11. An apparatus according to one of claims 7 to 9,

wherein the spectral value of each of the pattern coefficients of the requested spectral pattern is a complex coefficient comprising a real part and an imaginary part, and

wherein the pattern adaptation unit is configured to modify the requested spectral pattern provided by the storage unit by negating the real and the imaginary part of the spectral value of each of the pattern coefficients of the requested spectral pattern, or by swapping the real part or a negated real part and the imaginary part or a negated imaginary part of the spectral value of each of the pattern coefficients of the requested spectral pattern.

12. An apparatus according to one of claims 7 to 11, wherein the pattern adaptation unit is configured to modify the requested spectral pattern provided by the storage unit by realizing a temporal mirroring of the pattern by computing the complex conjugate of the pattern and applying a complex phase term.

13. An apparatus according to one of claims 7 to 12,

wherein the decoded audio signal spectrum is represented in an MDCT domain,

wherein the pattern adaptation unit is configured to modify the requested spectral pattern provided by the storage unit by modifying the spectral values of the pattern coefficients of the requested spectral pattern to obtain a modified spectral pattern, wherein the spectral values are represented in an Oddly-Stacked Discrete Fourier Transform domain,

wherein the pattern adaptation unit is configured to transform the spectral values of the pattern coefficients of the modified spectral pattern from the Oddly-Stacked Discrete Fourier Transform domain to the MDCT domain to obtain the determined spectral pattern, and

wherein the replacement unit is configured to replace the at least one or more pseudo coefficients by the determined spectral pattern being represented in the MDCT domain to obtain the modified audio signal spectrum being represented in the MDCT domain.

14. An apparatus for generating a plurality of spectral patterns, comprising:

a signal generator for generating a plurality of signals in a first domain,

a signal transformation unit for transforming each signal of the plurality of signals from the first domain to a second domain to obtain a plurality of spectral patterns, each pattern of the plurality of transformed spectral patterns comprising a plurality of coefficients,

a postprocessing unit for truncating the transformed spectral patterns by removing one or more of the coefficients of the transformed spectral patterns to obtain a plurality of processed patterns, and

a storage unit comprising a database or a memory, wherein the storage unit is configured to store each processed pattern of the plurality of processed patterns in the database or the memory,

wherein the signal generator is configured to generate each signal of the plurality of signals based on the formulae

$$x(t) = cos\,(2\pi\varphi(t))$$

and

$$\varphi(t) = \varphi(0) + \int_0^t 2\pi f(\tau)d\tau \quad ,$$

wherein t and τ indicate time,

wherein φ(t) is an instantaneous phase at t, and

wherein f(τ) is an instantaneous frequency at τ,

wherein each signal of the plurality of signals has a start frequency, being an instantaneous frequency of said signal at a first point-in-time, and a target frequency, being an instantaneous frequency of said signal at a different second point-in-time,

wherein the signal generator is configured to generate a first signal of the plurality of signals so that the target frequency of the first signal is equal to the start frequency, and

wherein the signal generator is configured to generate a different second signal of the plurality of signals so that the target frequency of the first signal is different from the start frequency.

15. An apparatus according to claim 14,

wherein the signal transformation unit is configured to transform each signal of the plurality of signals from the first domain, being a time domain, to a second domain, being a spectral domain,

wherein the signal transformation unit is configured to generate a first one of a plurality of time blocks for transforming said signal,

wherein each time block of the plurality of time blocks comprises a plurality of weighted samples, wherein each of said weighted samples is a signal sample of said signal being weighted by a weight of a plurality of weights, wherein the plurality of weights are assigned to said time block, and wherein each weight of the plurality of weights is assigned to a point-in-time,

wherein the start frequency of each signal of the plurality of signals is an instantaneous frequency of said signal at the first point-in-time, where a first one of the weights of the first one of the time blocks is assigned to the first point-in-time, where a second one of the weights of a different second one of the time blocks is assigned to the first point-in-time, wherein the first one of the time blocks and the second one of the time blocks overlap, and wherein the first one of the weights is equal to the second one of the weights, and

wherein the target frequency of each signal of the plurality of signals is an instantaneous frequency of said signal at the second point-in-time, where a third one of the weights of the first one of the time blocks is assigned to the second point-in-time, where a fourth one of the weights of a different third one of the time blocks, is assigned to the second point-in-time, wherein the first one of the time blocks and the third one of the time blocks overlap, and wherein the third one of the weights is equal to the fourth one of the weights.

16. An apparatus according to claim 14 or 15,

wherein each signal of the plurality of signals has a start phase, being a phase of said signal at a first point-in-time,

wherein the signal generator is configured to generate the plurality of signals such that the start phase of a first one of the plurality signals is equal to the start phase of a different second one of the plurality of the signals.

17. An apparatus according to one of claims 14 to 16, wherein the postprocessing unit is furthermore configured to conduct a rotation by an arbitrary phase angle on the

spectral coefficients of each of the transformed spectral patterns to obtain a plurality of arbitrarily rotated spectral patterns.

18. An apparatus according to one of claims 14 to 16, wherein the postprocessing unit is furthermore configured to conduct a rotation by $\pi/4$ on the spectral coefficients of each of the transformed spectral patterns to obtain a plurality of rotated spectral patterns.

19. An apparatus according to one of claims 14 to 18, wherein the signal generator is configured to generate the first signal, the second signal and one or more further signals as the plurality of signals, so that each difference of the target frequency and the start frequency of each of the further signals is an integer multiple of a difference of the target frequency and the start frequency of the second signal.

20. A method for generating an audio output signal based on an encoded audio signal spectrum, wherein the method comprises:

processing the encoded audio signal spectrum to obtain a decoded audio signal spectrum comprising a plurality of spectral coefficients, wherein each of the spectral coefficients has a spectral location within the encoded audio signal spectrum and a spectral value, wherein the spectral coefficients are sequentially ordered according to their spectral location within the encoded audio signal spectrum so that the spectral coefficients form a sequence of spectral coefficients,

determining one or more pseudo coefficients of the decoded audio signal spectrum, wherein each of the pseudo coefficients is one of the spectral coefficients,

replacing at least one or more pseudo coefficients by a determined spectral pattern to obtain a modified audio signal spectrum, wherein the determined spectral pattern comprises at least two pattern coefficients, wherein each of the at least two pattern coefficients has a spectral value, and

converting the modified audio signal spectrum to a time-domain to obtain the audio output signal.

21. A method for generating a plurality of spectral patterns, comprising:

generating a plurality of signals in a first domain,

transforming each signal of the plurality of signals from the first domain to a second domain to obtain a plurality of spectral patterns, each pattern of the plurality of transformed spectral patterns comprising a plurality of coefficients,

truncating the transformed spectral patterns by removing one or more of the coefficients of the transformed spectral patterns to obtain a plurality of processed patterns, and

storing each processed pattern of the plurality of processed patterns in a database or a memory,

wherein generating each signal of the plurality of signals is conducted based on the formulae

$$x(t) = cos\,(2\pi\varphi(t))$$

and

$$\varphi(t) = \varphi(0) + \int_0^t 2\pi f(\tau)d\tau \quad ,$$

wherein t and τ indicate time,

wherein φ(t) is an instantaneous phase at t, and

wherein f(τ) is an instantaneous frequency at τ,

wherein each signal of the plurality of signals has a start frequency, being an instantaneous frequency of said signal at a first point-in-time, and a target frequency, being an instantaneous frequency of said signal at a different second point-in-time,

wherein generating the plurality of signals is conducted by generating a first signal of the plurality of signals so that the target frequency of the first signal is equal to the start frequency, and

wherein generating the plurality of signals is conducted by generating a different second signal of the plurality of signals so that the target frequency of the first signal is different from the start frequency.

22. A computer program for implementing the method of claim 20 or 21 when being executed on a computer or signal processor.