Claims

1. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation; and

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation; and

wherein the un-windowing is configured to provide a given processing unit of the processed audio signal representation before a subsequent processing unit, which at least partially temporally overlaps the given processing unit, is available.

2. The apparatus according to claim 1,

wherein the apparatus is configured to adapt the un-windowing in dependence on processing parameters determining a processing used to derive the input audio signal representation.

3. The apparatus according to claim 1 or 2,

wherein the apparatus is configured to adapt the un-windowing in dependence on signal characteristics of the input audio signal representation and/or of an intermediate signal representation from which the input audio signal representation is derived.

4. The apparatus according to claim 3,

wherein the apparatus is configured to obtain one or more parameters describing signal characteristics of a time domain representation of a signal, to which the un-windowing is applied; and/or

wherein the apparatus is configured to obtain one or more parameters describing signal characteristics of a frequency domain representation of an intermediate signal, from which a time domain input audio signal, to which the un-windowing is applied, is derived; and

wherein the apparatus is configured to adapt the un-windowing in dependence on the one or more parameters.

5. The apparatus according to one of claims 1 to 4,

wherein the apparatus is configured to adapt the un-windowing to at least partially compensate for a lack of signal values of a subsequent processing unit.

6. The apparatus according to one of claims 1 to 5,

wherein the apparatus is configured to adapt the un-windowing to limit a deviation between the given processed audio signal representation and a result of an overlap-add between subsequent processing units of the input audio signal representation.

7. The apparatus according to one of claims 1 to 6,

wherein the apparatus is configured to adapt the un-windowing to limit values of the processed audio signal representation.

8. The apparatus according to one of claims 1 to 7,

wherein the apparatus is configured to adapt the un-windowing such that for an input audio signal representation which does not converge to zero in an end portion of a processing unit of the input audio signal, a scaling which is applied by the un-windowing in the end portion of the processing unit is reduced when compared to a case in which

the input audio signal representation converges to zero in the end portion of the processing unit.

9. The apparatus according to one of claims 1 to 8,

wherein the apparatus is configured to adapt the un-windowing, to thereby limit a dynamic range of the processed audio signal representation.

10. The apparatus according to one of claims 1 to 9,

wherein the apparatus is configured to adapt the un-windowing in dependence on a DC component of the input audio signal representation.

11. The apparatus according to one of claims 1 to 10,

wherein the apparatus is configured to at least partially remove a DC component of the input audio signal representation.

12. The apparatus according to one of claims 1 to 11,

wherein the un-windowing is configured to scale a DC-removed or DC-reduced version of the input audio signal representation in dependence on a window value in order to obtain the processed audio signal representation.

13. The apparatus according to one of claims 1 to 12,

wherein the un-windowing is configured to at least partially re-introduce a DC component after a scaling of a DC-removed or DC-reduced version of the input audio signal.

14. The apparatus according to one of claims 1 to 13,

wherein the un-windowing is configured to determine the processed audio signal representation $y_r[n]$ on the basis of the input audio signal representation $y[n]$ according to

$$y_r[n] = \frac{(y[n] - d)}{w_a[n]} + d, n \in [n_s; n_e]$$

wherein d is a DC component;

wherein n is a time index;

wherein n_s is a time index of a first sample of an overlap region;

wherein n_e is a time index of a last sample of the overlap region; and

wherein $w_a[n]$ is an analysis window used for a provision of the input audio signal representation.

15. The apparatus according to one of claims 1 to 14,

wherein the apparatus is configured to determine the DC component using one or more values of the input audio signal representation which lie in a time portion in which an analysis window used in a provision of the input audio signal representation comprises one or more zero values.

16. The apparatus according to one of claims 1 to 15,

wherein the apparatus is configured to obtain the input audio signal representation using a spectral domain-to-time domain conversion.

17. Audio signal processor for providing a processed audio signal representation on the basis of an audio signal to be processed,

wherein the audio signal processor is configured to apply an analysis windowing to a time domain representation of a processing unit of an audio signal to be processed, to obtain a windowed version of the time domain representation of the processing unit of the audio signal to be processed, and

wherein the audio signal processor is configured to obtain a spectral domain representation of the audio signal to be processed on the basis of the windowed version,

wherein the audio signal processor is configured to apply a spectral domain processing to the obtained spectral domain representation, to obtain a processed spectral domain representation,

wherein the audio signal processor is configured to obtain a processed time domain representation on the basis of the processed spectral domain representation, and

wherein the audio signal processor comprises an apparatus according to one of claim 1 to 16, wherein the apparatus is configured to obtain the processed time domain representation as its input audio signal representation, and to provide, on the basis thereof, the processed audio signal representation.

18. The audio signal processor according to claim 17,

wherein the apparatus is configured to adapt the un-windowing using window values of the analysis windowing.

19. An audio decoder for providing a decoded audio representation on the basis of an encoded audio representation,

wherein the audio decoder is configured to obtain a spectral domain representation of an encoded audio signal on the basis of the encoded audio representation,

wherein the audio decoder is configured to obtain a time domain representation of the encoded audio signal on the basis of the spectral domain representation, and

wherein the audio decoder comprises an apparatus according to one of the claims 1 to 16,

wherein the apparatus is configured to obtain the time domain representation as its input audio signal representation, and to provide, on the basis thereof, the processed audio signal representation.

20. The audio decoder according to claim 19,

wherein the audio decoder is configured to provide the audio signal representation of a given processing unit before a subsequent processing unit which temporally overlaps with the given processing unit is decoded.

21. An audio encoder for providing an encoded audio representation on the basis of an input audio signal representation,

wherein the audio encoder comprises an apparatus according to one of claims 1 to 16, wherein the apparatus is configured to obtain a processed audio signal representation on the basis of the input audio signal representation, and

wherein the audio encoder is configured to encode the processed audio signal representation.

22. The audio encoder according to claim 21, wherein the audio encoder is configured to obtain a spectral domain representation on the basis of the processed audio signal representation, wherein the processed audio signal representation is a time domain representation, and

wherein the audio encoder is configured to use a spectral-domain encoding to encode the spectral domain representation, to obtain the encoded audio representation.

23. The audio encoder according to claim 21 or 22, wherein the audio encoder is configured to encode the processed audio signal representation using a time-domain encoding to obtain the encoded audio representation.

24. The audio encoder according to one of the claims 21 to 23, wherein the audio encoder is configured to encode the processed audio signal representation using a switching encoding which switches between a spectral-domain encoding and a time-domain encoding.

25. The audio encoder according to one of the claims 21 to 24, wherein the apparatus is configured to perform a downmix of a plurality of input audio signals, which form the input audio signal representation, in a spectral domain, and to provide a downmixed signal as the processed audio signal representation.

~~26. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,~~

~~wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,~~

~~wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation; and~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation; and~~

~~wherein the apparatus is configured to adapt the un-windowing, to thereby limit a dynamic range of the processed audio signal representation.~~

~~27~~26. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation; and

wherein the un-windowing provides a given processing unit of the processed audio signal representation before a subsequent processing unit, which at least partially temporally overlaps the given processing unit, is available.

~~28. A method for providing a processed audio signal representation on the basis of an audio signal to be processed,~~

~~wherein the method comprises applying an analysis windowing to a time domain representation of a processing unit of an audio signal to be processed, to obtain a windowed version of the time domain representation of the processing unit of the audio signal to be processed, and~~

~~wherein the method comprises obtaining a spectral domain representation of the audio signal to be processed on the basis of the windowed version,~~

~~wherein the method comprises applying a spectral domain processing to the obtained spectral domain representation, to obtain a processed spectral domain representation,~~

~~wherein the method comprises obtaining a processed time domain representation on the basis of the processed spectral domain representation, and~~

~~wherein the method comprises providing the processed audio signal representation using the method according to claim 27, wherein the processed time domain representation is used as the input audio signal for performing the method according to claim 30.~~

~~29. A method for providing a decoded audio representation on the basis of an encoded audio representation,~~

~~wherein the method comprises obtaining a spectral domain representation of an encoded audio signal on the basis of the encoded audio representation,~~

~~wherein the method comprises obtaining a time domain representation of the encoded audio signal on the basis of the spectral domain representation, and~~

~~wherein the method comprises providing the processed audio signal representation using the method according to claim 27, wherein the time domain representation is used as the input audio signal for performing the method according to claim 30.~~

~~30~~27. A method for providing an encoded audio representation on the basis of an input audio signal representation,

wherein the method comprises obtaining a processed audio signal representation on the basis of the input audio signal representation using the method according to claim ~~27~~26, and

wherein the method comprises encoding the processed audio signal representation.

31. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the adapting of the un-windowing is performed such that a large amplification caused by the un-windowing without an adaptation is reduced, to thereby limit a dynamic range of the processed audio signal representation, and

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.

32. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation; and

wherein the apparatus is configured to adapt the un-windowing such that for an input audio signal representation which does not converge to zero in an end portion of a processing unit of the input audio signal, a scaling which is applied by the un-windowing in the end portion of the processing unit is reduced when compared to a case in which the input audio signal representation converges to zero in the end portion of the processing unit, and

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.~~

~~33. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,~~

~~wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,~~

~~wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,~~

~~wherein the apparatus is configured to adapt the un-windowing in dependence on a DC component of the input audio signal representation,~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.~~

~~34. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,~~

~~wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,~~

~~wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,~~

~~wherein the apparatus is configured to at least partially remove a DC component of the input audio signal representation.~~

35. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the un-windowing is configured to scale a DC-removed or DC-reduced version of the input audio signal representation in dependence on a window value in order to obtain the processed audio signal representation.

36. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the un-windowing is configured to at least partially re-introduce a DC component after a scaling of a DC-removed or DC-reduced version of the input audio signal.

37. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing is configured to determine the processed audio signal representation $y_r[n]$ on the basis of the input audio signal representation y[n] according to

$$y_r[n] = \frac{(y[n] - d)}{w_a[n]} + d, n \in [n_s; n_e]$$

wherein d is a DC component;

wherein n is a time index;

wherein n_s is a time index of a first sample of an overlap region;

wherein n_e is a time index of a last sample of the overlap region; and

wherein $w_a[n]$ is an analysis window used for a provision of the input audio signal representation.

38. An apparatus for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the apparatus is configured to determine a DC component using one or more values of the input audio signal representation which lie in a time portion in which an analysis window used in a provision of the input audio signal representation comprises one or more zero values.

39. An audio encoder for providing an encoded audio representation on the basis of an input audio signal representation,

wherein the audio encoder comprises an apparatus for providing a processed audio signal representation on the basis of the input audio signal representation,

wherein the audio encoder is configured to encode the processed audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation, and

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.

40. An audio decoder for providing a decoded audio representation on the basis of an encoded audio representation,

wherein the audio decoder is configured to obtain a spectral domain representation of an encoded audio signal on the basis of the encoded audio representation,

wherein the audio decoder is configured to obtain a time domain representation of the encoded audio signal on the basis of the spectral domain representation, and

wherein the audio decoder comprises an apparatus,

wherein the apparatus is configured to obtain the time domain representation as its input audio signal representation, and to provide, on the basis thereof, a processed audio signal representation,

wherein the apparatus is configured to apply an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the apparatus is configured to adapt the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the audio decoder is configured to provide the audio signal representation of a given processing unit before a subsequent processing unit which temporally overlaps with the given processing unit is decoded.

41. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the adapting of the un-windowing is performed such that for an input audio signal representation which does not converge to zero in an end portion of a processing unit of the input audio signal, a scaling which is applied by the un-windowing in the end portion of the processing unit is reduced when compared to a case in which the input

~~audio signal representation converges to zero in the end portion of the processing unit, and~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.~~

~~42. A method for providing a processed audio signal representation on the basis of input audio signal representation,~~

~~wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,~~

~~wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,~~

~~wherein the method performs the adapting of the un-windowing in dependence on a DC component of the input audio signal representation,~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation.~~

~~43. A method for providing a processed audio signal representation on the basis of input audio signal representation,~~

~~wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,~~

~~wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,~~

~~wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,~~

wherein the method comprises at least partially removing a DC component of the input audio signal representation.

44. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the un-windowing scales a DC-removed or DC-reduced version of the input audio signal representation in dependence on a window value in order to obtain the processed audio signal representation.

45. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the un-windowing at least partially re-introduces a DC component after a scaling of a DC-removed or DC-reduced version of the input audio signal.

46. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing determines the processed audio signal representation $y_r[n]$ on the basis of the input audio signal representation y[n] according to

$$y_r[n] = \frac{(y[n] - d)}{w_a[n]} + d, n \in [n_s; n_e]$$

wherein d is a DC component;

wherein n is a time index;

wherein n_s is a time index of a first sample of an overlap region;

wherein n_e is a time index of a last sample of the overlap region; and

wherein $w_a[n]$ is an analysis window used for a provision of the input audio signal representation.

47. A method for providing a processed audio signal representation on the basis of input audio signal representation,

wherein the method comprises applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation,

wherein the method comprises adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the method comprises determining a DC component using one or more values of the input audio signal representation which lie in a time portion in which an analysis window used in a provision of the input audio signal representation comprises one or more zero values.

48. A method for providing an encoded audio representation on the basis of an input audio signal representation,

wherein the method comprises obtaining a processed audio signal representation on the basis of the input audio signal representation using a method for providing a processed audio signal representation on the basis of input audio signal representation comprising,

applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation, and

adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation, and

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the method for providing the encoded audio representation comprises encoding the processed audio signal representation.

4928. A method for providing a decoded audio representation on the basis of an encoded audio representation,

wherein the method comprises obtaining a spectral domain representation of an encoded audio signal on the basis of the encoded audio representation,

wherein the method comprises obtaining a time domain representation of the encoded audio signal on the basis of the spectral domain representation, and

wherein the method comprises providing the processed audio signal representation using a method for providing a processed audio signal representation on the basis of input audio signal representation, wherein the time domain representation is used as the input audio signal, comprising

applying an un-windowing, in order to provide the processed audio signal representation on the basis of the input audio signal representation, and

adapting the un-windowing in dependence on one or more signal characteristics and/or in dependence on one or more processing parameters used for a provision of the input audio signal representation,

wherein the un-windowing at least partially reverses an analysis windowing used for a provision of the input audio signal representation,

wherein the method comprises providing the audio signal representation of a given processing unit before a subsequent processing unit which temporally overlaps with the given processing unit is decoded.

~~50~~29. A computer program having a program code for performing, when running on a computer, a method according to one of claims ~~27-31~~26, 27 and ~~41-49~~28.