CLAIMS:

1. An apparatus for encoding audio object parameters, the apparatus comprising means for:

identifying one of at least two audio objects within an audio environment to be encoded separately;

obtaining, for time-frequency elements of a frame comprising at least one time element and at least one frequency element, ratio parameters for the at least two audio objects, the ratio parameters configured to identify a distribution of a specific audio object within an object part of the total audio environment and for a specific time-frequency element;

grouping, for the time-frequency elements, ratio parameters associated with the at least two audio objects,

quantizing the ratio parameters within the grouping, wherein the quantizing the ratio parameter is configured to generate integer representations of the ratio parameter values which sum for a specific grouping to a defined integer value;

encoding the integer representations of the ratio parameter values within a first grouping or first set of groupings as enumeration indexes;

encoding subsequent groupings as difference values with respect to the first grouping or first set of groupings, wherein the means for encoding subsequent groupings is further for:

selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings; and

encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings,

wherein the means for grouping is for ordering the ratio parameters within the grouping such that the selected sub-set of the integer representations of the ratio parameter value comprises the integer representations of the ratio parameter value associated with the selected one of the at least two audio objects to be encoded separately;

wherein the means for selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings is for:

determining that the integer representation of the ratio parameter value corresponding to the one of at least two audio objects within an audio environment to be encoded separately is zero for all frequency elements of the first time element; and

selecting all but two of the integer representations for a specific grouping, wherein the selecting does not include the integer representation of the ratio parameter value corresponding to the one of at least two audio objects within an audio environment to be encoded separately.

2. The apparatus as claimed in claim 1, wherein the means for selecting a subset of the integer representations of the ratio parameter values for the subsequent groupings is for selecting all but one of the integer representations for a specific grouping, as the integer representations of the ratio parameter values for the grouping is a defined value for every grouping.

3. The apparatus as claimed in any of claims 1 to 2, wherein the means for grouping, for a time-frequency elements, ratio parameters associated with the at least one audio object is for generating vectors of the ratio parameters.

4. The apparatus as claimed in any of claims 1 to 3, wherein the means for encoding the integer representations of the ratio parameter values within a first grouping or first set of groupings as enumeration indexes is for generating integer values based on an indexing from the grouping, wherein the generated integer value represents the ratio parameters for the audio objects.

5. The apparatus as claimed in claim 4, wherein the means for quantizing the ratio parameters within the grouping, wherein the quantizing the ratio parameter is configured to generate integer representations of the ratio parameter values which sum for a specific grouping to a defined integer value is for:

generating a single number value by appending elements from the grouping of ratio parameters; and

generating the integer representation from the single number, by performing an iteration loop from a zeroth iteration up to and including the single number of

iterations and sequentially associating index values to iteration loop iteration numbers which have a valid selection of ratio parameters, wherein the integer value is the highest index value.

6. The apparatus as claimed in any of claims 1 to 5, wherein the means for quantizing the ratio parameters within the grouping is for:

quantizing, using a lowest nearest neighbour scalar quantization, ratio values within a specific selection to obtain quantization index values;

calculating reconstructed values of the ratio parameters for the specific selection;

calculating an error value based on the difference between the reconstructed ratio values and the specific selection of ratio parameter values;

determining a sum of quantized index values; and

selecting at least one quantized index value to increment such that the sum of quantized index values is equal to an expected index sum.

7. The apparatus as claimed in claim 6, wherein the means for selecting at least one quantized index value to increment such that the sum of quantized index values is equal to an expected index sum is for one of:

selecting the at least one quantized index value to increment based on identifying a greatest decrease within the error value when the index value is incremented; or

selecting the at least one quantized index value to increment based on identifying a minimum increase within the error value when the index value is incremented.

8. The apparatus as claimed in any of claims 1 to 7, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for:

performing with respect to selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings with respect to a specific time element of the frame:

determining a number of bits required for entropy coding differences between the quantized frequency elements for a first and second entropy coding parameters;

determining a number of bits required for entropy coding differences between the quantized time elements for the first and second entropy coding parameters;

selecting, for the specific time element, the first entropy coding parameter or the second entropy coding parameter based on a smaller number of bits required for coding the differences in the specific time element of the frame;

selecting one of the entropy coding of the differences between frequency elements or time elements for the selected first entropy coding parameter or the second entropy coding parameter based entropy coding based on a smaller number of bits required for coding the differences in the specific time element of the frame.

9. The apparatus as claimed in claim 8, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for encoding the selected one of the entropy coding of the differences between frequency elements or time elements for the selected first entropy coding parameter or the second entropy coding parameter based entropy coding.

10. The apparatus as claimed in any of claims 1 to 8, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for:

performing with respect to a set of selection of ratio parameters with respect to a specific frequency element of the frame:

determining a number of bits required entropy coding quantized differences between frequency elements for a first and second entropy coding parameters;

determining a number of bits required entropy coding quantized differences between time elements for the first and second entropy coding parameters;

selecting, for the specific frequency element, the first entropy coding parameter or the second entropy coding parameter based on a smaller number of bits required for coding the differences in the specific time element of the frame;

selecting, for the specific frequency element, one of the entropy coding of differences between frequency elements or time elements for the selected first entropy coding parameter or the second entropy coding parameter based entropy coding based on a smaller number of bits required for coding the differences in the specific time element of the frame.

11. The apparatus as claimed in claim 10, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for encoding the selected one of the entropy coding of the differences between frequency elements or time elements for the selected first entropy coding parameter or the second entropy coding parameter based entropy coding.

12. The apparatus as claimed in any of claims 7 to 11, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for:

generating an indicator indicating the selected first entropy coding parameter or the second entropy coding parameter; and

generating an indicator indicating the selected one of the entropy coding of differences between frequency elements or time elements for the selected first entropy coding parameter or the second entropy coding parameter based entropy coding.

13. The apparatus as claimed in any of claims 7 to 12, wherein the entropy coding is Golomb-Rice entropy coding and the first entropy coding parameter is a Golomb-Rice entropy coding order 0 and the second entropy coding parameter is a Golomb-Rice entropy coding order 1.

14. The apparatus as claimed in any of claims 7 to 13, wherein the means for encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings is for differential encoding of the selection of ratio parameters based on the precedingly indexed time element grouping of ratio parameters where there is no precedingly indexed frequency element grouping of ratio parameters.

15. The apparatus as claimed in any of claims 1 to 14, wherein the ratio parameters configured to identify a distribution of a specific object within the object part of the total audio environment are ISM ratios.

16. The apparatus as claimed in any of claims 1 to 15, wherein the means for selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings is further for:

determining the integer representations of the ratio parameter value associated with the selected one of the at least two audio objects to be encoded separately is substantially zero for all frequency elements of the first grouping or first set of groupings; and

encoding only the remaining selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings.

17. The apparatus as claimed in any of claims 1 to 16, wherein the first grouping is a grouping of a first time and frequency element of the groupings and the first set of groupings are groupings of frequency element groupings associated with the first time element.

18. The apparatus as claimed in any of claims 1 to 17, wherein the means is further for encoding the identified one of the at least two audio objects separately.

19. An apparatus for decoding audio object parameters, the apparatus comprising means for:

obtaining a bitstream comprising encoded integer representations of ratio parameters, for time-frequency elements of a frame comprising at least one time element and at least one frequency element, the integer representations of ratio parameters associated with audio objects within an audio environment, the audio environment comprising more than two audio object and the ratio parameters configured to identify a distribution of a specific object within the object part of the total audio environment and for a specific time-frequency element;

identifying one of at least two audio objects within the audio environment has been encoded separately;

decoding enumeration indexes within a first grouping or first set of groupings to generate decoded integer representations of the ratio parameter values for the first grouping or first set of groupings;

decoding subsequent groupings as difference values with respect to the first grouping or first set of groupings, wherein the means for decoding subsequent groupings is further for:

determining with respect to the subsequent groupings a further ratio parameter value based on a difference between a defined total ratio value and a sum of the ratio values within the grouping;

wherein the means for decoding subsequent groupings as difference values with respect to the first grouping or first set of groupings is further for:

determining that the ratio parameter value corresponding to the one of at least two audio objects within an audio environment encoded separately is zero for all frequency elements of the first time element; and

determining with respect to the subsequent groupings an additional ratio parameter value with a value of zero representing the one of at least two audio objects within an audio environment encoded separately.

20. The apparatus as claimed in any of claims 19, wherein the grouping is a vector of the ratio parameters.

21. The apparatus as claimed in any of claims 19 to 20, wherein the means for decoding enumeration indexes within a first grouping or first set of groupings to generate decoded integer representations of the ratio parameter values for the first grouping or first set of groupings is for:

obtaining an integer value representing encoded ratio parameters;

converting the integer value to a selection of ratio parameters based on the indexing of the vector; and

regenerating at least one further ratio parameter from the selection of the ratio parameters.

22. The apparatus as claimed in any of claims 19 to 20, wherein the means for decoding subsequent groupings as difference values with respect to the first grouping or first set of groupings is for:

obtaining a difference indicator identifying a frequency difference or time difference encoding;

obtaining an entropy encoding indicator identifying an entropy encoding parameter;

decoding the remaining selection of the ratio parameters for the frame based on the difference indicator and the entropy encoding indicator.

23. The apparatus as claimed in any of claims 19 to 22, wherein the ratio parameters configured to identify a distribution of a specific object within the object part of the total audio environment are ISM ratios.

24. A method for encoding audio object parameters, the method comprising:

identifying one of at least two audio objects within an audio environment to be encoded separately;

obtaining, for time-frequency elements of a frame comprising at least one time element and at least one frequency element, ratio parameters for the at least two audio objects, the ratio parameters configured to identify a distribution of a

specific audio object within an object part of the total audio environment and for a specific time-frequency element;

grouping, for the time-frequency elements, ratio parameters associated with the at least two audio objects,

quantizing the ratio parameters within the grouping, wherein the quantizing the ratio parameter is configured to generate integer representations of the ratio parameter values which sum for a specific grouping to a defined integer value;

encoding the integer representations of the ratio parameter values within a first grouping or first set of groupings as enumeration indexes;

encoding subsequent groupings as difference values with respect to the first grouping or first set of groupings, wherein the encoding subsequent groupings further comprises:

selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings; and

encoding the selected sub-set of the integer representations of the ratio parameter value for the subsequent groupings as difference values with respect to the first grouping or first set of groupings,

wherein grouping further comprises ordering the ratio parameters within the grouping such that the selected sub-set of the integer representations of the ratio parameter value comprises the integer representations of the ratio parameter value associated with the selected one of the at least two audio objects to be encoded separately;

wherein selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings further comprises:

determining that the integer representation of the ratio parameter value corresponding to the one of at least two audio objects within an audio environment to be encoded separately is zero for all frequency elements of the first time element; and

selecting all but two of the integer representations for a specific grouping, wherein the selecting does not include the integer representation of the ratio parameter value corresponding to the one of at least two audio objects within an audio environment to be encoded separately.

25. The method as claimed in claim 24, wherein selecting a sub-set of the integer representations of the ratio parameter values for the subsequent groupings further comprises selecting all but one of the integer representations for a specific grouping, as the integer representations of the ratio parameter values for the grouping is a defined value for every grouping.

26. A method for decoding audio object parameters, the method comprising:

obtaining a bitstream comprising encoded integer representations of ratio parameters, for time-frequency elements of a frame comprising at least one time element and at least one frequency element, the integer representations of ratio parameters associated with audio objects within an audio environment, the audio environment comprising more than two audio object and the ratio parameters configured to identify a distribution of a specific object within the object part of the total audio environment and for a specific time-frequency element;

identifying one of at least two audio objects within the audio environment has been encoded separately;

decoding enumeration indexes within a first grouping or first set of groupings to generate decoded integer representations of the ratio parameter values for the first grouping or first set of groupings;

decoding subsequent groupings as difference values with respect to the first grouping or first set of groupings, wherein decoding subsequent groupings further comprises determining with respect to the subsequent groupings a further ratio parameter value based on a difference between a defined total ratio value and a sum of the ratio values within the grouping;

wherein decoding subsequent groupings as difference values with respect to the first grouping or first set of groupings comprises:

determining that the ratio parameter value corresponding to the one of at least two audio objects within an audio environment encoded separately is zero for all frequency elements of the first time element; and

determining with respect to the subsequent groupings an additional ratio parameter value with a value of zero representing the one of at least two audio objects within an audio environment encoded separately.