CLAIMS

1. An audio signal encoding method, comprising:

determining, according to a quantity of available bits and a predetermined first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

selecting, according to quantized envelopes of all subbands, k subbands from all the subbands~~, or selecting k subbands from all the subbands according to a psychoacoustic model~~; and

performing a first-time encoding operation on spectral coefficients of the k subbands.

2. The method according to claim 1, wherein the performing a first-time encoding operation on spectral coefficients of the k subbands comprises:

normalizing the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and

quantizing the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

3. The method according to claim 2, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determining, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

performing a second-time encoding operation on spectral coefficients of the m vectors.

4. The method according to claim 3, wherein the determining, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed comprises:

determining, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors on which second-time encoding is to be performed;

determining candidate spectral coefficients according to the quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and

selecting the m vectors from vectors to which the candidate spectral coefficients belong.

5. The method according to claim 4, wherein the selecting the m vectors from vectors to which the candidate spectral coefficients belong comprises:

sorting the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors; and

selecting the first m vectors from the sorted vectors, wherein

the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

6. The method according to any one of claims 3 to 5, wherein the performing a second-time encoding operation on spectral coefficients of the m vectors comprises:

determining global gains of the spectral coefficients of the m vectors;

normalizing the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and

quantizing normalized spectral coefficients of the m vectors.

7. An audio signal decoding method, comprising:

determining, according to a quantity of available bits and a predetermined first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

selecting, according to decoded envelopes of all subbands, k subbands from all the subbands~~, or selecting k subbands from all the subbands according to a psychoacoustic model~~; and

performing a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands.

8. The method according to claim 7, wherein the method further comprises:

if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding operation, determining, according to the quantity of remaining bits and a second saturation threshold j, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer; and

performing a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

9. The method according to claim 8, wherein the method further comprises:

determining a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.

10. An audio signal encoding device, comprising:

a determining unit, configured to determine, according to a quantity of available bits and a

predetermined first saturation threshold i, a quantity k of subbands to be encoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the determining unit, select, according to quantized envelopes of all subbands, k subbands from all the subbands~~, or select k subbands from all the subbands according to a psychoacoustic model~~; and

an encoding unit, configured to perform a first-time encoding operation on spectral coefficients of the k subbands selected by the selecting unit.

11. The device according to claim 10, wherein the encoding unit is specifically configured to: normalize the spectral coefficients of the k subbands, to obtain normalized spectral coefficients of the k subbands; and quantize the normalized spectral coefficients of the k subbands, to obtain quantized spectral coefficients of the k subbands.

12. The device according to claim 11, wherein

the selecting unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time encoding operation, determine, according to the quantity of remaining bits, a second saturation threshold j, and the quantized spectral coefficients of the k subbands, m vectors on which second-time encoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the encoding unit is further configured to perform a second-time encoding operation on spectral coefficients of the m vectors determined by the selecting unit.

13. The device according to claim 12, wherein the selecting unit is specifically configured to determine, according to the quantity of remaining bits and the second saturation threshold j, a quantity m of vectors to be encoded; determine candidate spectral coefficients according to the quantized spectral coefficients of the k subbands, wherein the candidate spectral coefficients comprise spectral coefficients that are obtained by subtracting the corresponding quantized spectral coefficients of the k subbands from the normalized spectral coefficients of the k subbands; and select the m vectors from vectors to which the candidate spectral coefficients belong.

14. The device according to claim 13, wherein the selecting unit is specifically configured to sort the vectors to which the candidate spectral coefficients belong, to obtain sorted vectors; and select the first m vectors from the sorted vectors, wherein the sorted vectors are divided into a first group of vectors and a second group of vectors, the first group of vectors are arranged before the second group of vectors, the first group of vectors correspond to vectors whose values are all 0s in vectors to which the quantized spectral coefficients of the k subbands belong, and the second group of vectors correspond to vectors whose values are not all 0s in the vectors to which the quantized spectral coefficients of the k subbands belong.

15. The device according to any one of claims 10 to 14, wherein the encoding unit is specifically configured to determine global gains of the spectral coefficients of the m vectors; normalize the spectral coefficients of the m vectors by using the global gains of the spectral coefficients of the m vectors; and quantize normalized spectral coefficients of the m vectors.

16. An audio signal decoding device, comprising:

a first determining unit, configured to determine, according to a quantity of available bits and a predetermined first saturation threshold i, a quantity k of subbands to be decoded, wherein i is a positive number, and k is a positive integer;

a selecting unit, configured to: according to the quantity k of subbands that is determined by the first determining unit, select, according to decoded envelopes of all subbands, k subbands from all the subbands~~, or select k subbands from all the subbands according to a psychoacoustic model~~; and

a decoding unit, configured to perform a first-time decoding operation, to obtain quantized spectral coefficients of the k subbands selected by the selecting unit.

17. The device according to claim 16, wherein

the first determining unit is further configured to: if a quantity of remaining bits in the quantity of available bits is greater than or equal to a first bit quantity threshold after the first-time decoding, determine, according to the quantity of remaining bits, the second saturation threshold j, and the first group of decoded spectral coefficients, a quantity m of vectors on which second-time decoding is to be performed, wherein j is a positive number, and m is a positive integer; and

the decoding unit is further configured to perform a second-time decoding operation, to obtain normalized spectral coefficients of the m vectors.

18. The device according to claim 17, further comprising:

a second determining unit, configured to determine a correspondence between the normalized spectral coefficients of the m vectors and the quantized spectral coefficients of the k subbands.