Claims

1. An apparatus for decoding an encoded audio signal, wherein one or more tracks are associated with the encoded audio signal, each one of the tracks having a plurality of track positions and a plurality of pulses, wherein the apparatus comprises:

a pulse information decoder ~~(110)~~ for decoding a plurality of pulse positions, wherein each one of the pulse positions indicates one of the track positions of one of the tracks to indicate a position of one of the pulses of the track, and wherein the pulse information decoder ~~(110)~~ is configured to decode the plurality of pulse positions by using a track positions number indicating a total number of the track positions of at least one of the tracks, a total pulses number indicating a total number of the pulses of at least one of the tracks, and one state number; and

a signal decoder ~~(120)~~ for decoding the encoded audio signal by generating a synthesized audio signal using the plurality of pulse positions and a plurality of predictive filter coefficients being associated with the encoded audio signal~~.~~,

wherein the pulse information decoder ~~(110)~~ is furthermore adapted to decode a plurality of pulse signs using the track positions number, the total pulses number and the state number, wherein each one of the pulse signs indicates a sign of one of the plurality of pulses, and

wherein the signal decoder ~~(120)~~ is adapted to decode the encoded audio signal by generating a synthesized audio signal furthermore using the plurality of pulse signs.

2. An apparatus according to claim 1, wherein the one or more tracks comprise at least a last track and one or more other tracks, and

wherein the pulse information decoder ~~(110)~~ is adapted to generate a first substate number and a second substate number from the state number,

wherein the pulse information decoder ~~(110)~~ is configured to decode a first group of the pulse positions based on the first substate number, and

wherein the pulse information decoder ~~(110)~~ is configured to decode a second group of the pulse positions based on the second substate number,

wherein the second group of the pulse positions only consists of pulse positions indicating track positions of the last track, and

wherein the first group of the pulse positions only consists of pulse positions indicating track positions of the one or more other tracks.

3. An apparatus according to claim 2, wherein the pulse information decoder is configured to generate the first substate number and the second substate number by dividing the state number by $f(p_k, N)$ to obtain an integer part and a remainder as a division result, wherein the integer part is the first substate number and wherein the remainder is the second substate number, wherein p_k indicates for each one of the one or more tracks the number of pulses, and wherein N indicates for each one of the one or more tracks the number of track positions.

4. An apparatus according to one of the preceding claims, wherein the pulse information decoder ~~(110)~~ is adapted to conduct a test comparing the state number or an updated state number with a threshold value.

5. An apparatus according to claim 4, wherein the pulse information decoder ~~(110)~~ is adapted to conduct the test by comparing, whether the state number or an updated state number is greater than, greater than or equal to, smaller than, or smaller than or equal to the threshold value, and wherein the pulse information decoder ~~(110)~~ is furthermore adapted to update the state number or an updated state number depending on the result of the test.

6. An apparatus according to claim 5, wherein the pulse information decoder ~~(110)~~ is configured to compare the state number or the updated state number with the threshold value for each track position of one of the plurality of tracks.

7. An apparatus according to claim 1 or 2,

wherein the pulse information decoder ~~(110)~~ is configured to divide one of the tracks into a first track partition, comprising at least two track positions of the plurality of track positions, and into a second track partition, comprising at least two other track positions of the plurality of track positions,

wherein the pulse information decoder ~~(110)~~ is configured to generate a first substate number and a second substate number based on the state number,

wherein the pulse information decoder ~~(110)~~ is configured to decode a first group of pulse positions associated with the first track partition based on the first substate number, and

wherein the pulse information decoder ~~(110)~~ is configured to decode a second group of pulse positions associated with the second track partition based on the second substate number.

8. An apparatus for encoding an audio signal, comprising:

a signal processor ~~(210)~~ for determining a plurality of predictive filter coefficients being associated with the audio signal, for generating a residual signal based on the audio signal and the plurality of predictive filter coefficients; and

a pulse information encoder ~~(220)~~ for encoding a plurality of pulse positions relating to one or more tracks, to encode the audio signal, the one or more tracks being associated with the residual signal, each one of the tracks having a plurality of track positions and a plurality of pulses, wherein each one of the pulse positions indicates one of the track positions of one of the tracks to indicate a position of one of the pulses of the track, wherein the pulse information encoder ~~(220)~~ is configured to encode the plurality of pulse positions by generating a state number, such that the pulse positions can be decoded only based on the state number, a track positions number indicating a total number of the track positions of at least one of the tracks, and a total pulses number indicating a total number of the pulses of at least one of the tracks~~.~~

wherein the pulse information encoder ~~(220)~~ is configured to add an integer value to an intermediate number for each pulse at a track position for each track position of one of the tracks, to obtain the state number.

9. An apparatus for encoding according to claim 8, wherein the pulse information encoder ~~(220)~~ is adapted to encode a plurality of pulse signs, wherein each one of the pulse signs indicates a sign of one of the plurality of pulses, wherein the pulse information encoder ~~(220)~~ is configured to encode the plurality of pulse signs by generating the state number, such that the pulse signs can be decoded only based on the state number, the track positions number indicating a total number of the track positions of at least one of the tracks, and the total pulses number.

10. An apparatus according to claim 8 or 9, wherein the pulse information encoder ~~(220)~~ is configured to add the integer value to the intermediate number for each pulse at a track position for each track position of one of the tracks, to obtain the state number, wherein the integer value is defined by f(p, k-1), wherein p indicates a number of found pulses, wherein k indicates a track position, and wherein f(p, N) indicates the number of possible configurations for a track having N track positions and p signed pulses.

11. An apparatus according to claim 8 or 9,

wherein the pulse information encoder ~~(220)~~ is configured to divide one of the tracks into a first track partition, comprising at least two track positions of the plurality of track positions, and into a second track partition, comprising at least two other track positions of the plurality of track positions,

wherein the pulse information encoder ~~(220)~~ is configured to encode a first substate number associated with the first partition,

wherein the pulse information encoder ~~(220)~~ is configured to encode a second substate number associated with the second partition, and

wherein the pulse information encoder ~~(220)~~ is configured to combine the first substate number and the second substate number to obtain the state number.

12. Method for decoding an encoded audio signal, wherein one or more tracks are associated with the encoded audio signal, each one of the tracks having a plurality of track positions and a plurality of pulses, wherein the method comprises:

decoding a plurality of pulse positions, wherein each one of the pulse positions indicates one of the track positions of one of the tracks to indicate a position of one of the pulses of the track, and wherein the plurality of pulse positions are decoded by using a track positions number indicating a total number of the track positions of at least one of the tracks, a total pulses number indicating a total number of the pulses of at least one of the tracks, and one state number,