Claims

1. An apparatus for enhancing a quantization efficiency in linear predictive encoding of a signal of speech and/or audio, the apparatus comprising:

a coefficient conversion unit, implemented by a processor, configured to obtain a line spectral frequency (LSF) coefficient or an immitance spectral frequency (ISF) coefficient of a mid-subframe of the signal from a linear predictive coding (LPC) coefficient of the mid-subframe;

a weighting function determination unit, implemented by a processor, configured to determine a weighting function based on a magnitude of a spectral bin corresponding to a frequency of the ISF coefficient or the LSF coefficient of the mid-subframe, wherein the weighting function is based on a maximum value of the magnitude of the spectral bin corresponding to the frequency of the ISF coefficient or the LSF coefficient and the magnitude of at least one neighboring spectral bin; and

a quantization unit configured to obtain a parameter associated with the mid-subframe from a quantized ISF coefficient or a quantized LSF coefficient of a current frame and a previous frame, based on the determined weighting function of the mid-subframe.

2. The apparatus of claim 1, wherein the weighting function is based on a spectral envelope of the signal.

3. The apparatus of claim 1, wherein the weighting function is varied depending on at least one of a bandwidth and a coding mode of the signal.

4. The apparatus of claim 1, wherein the weighting function is determined by combining a first weighting function based on the magnitude of the spectral bin corresponding to the ISF coefficient or the LSF coefficient and a second weighting function based on frequency information for the ISF coefficient or the LSF coefficient.

5. A quantization apparatus comprising:

a processor configured:

to obtain a line spectral frequency (LSF) coefficient or an immittance spectral frequency (ISF) coefficient of a mid-subframe of a signal of audio and/or speech from a linear predictive coding (LPC) coefficient of the mid-subframe;

to determine a weighting function based on a magnitude of a spectral bin corresponding to a frequency of the ISF coefficient or the LSF coefficient of the mid-subframe, wherein the weighting function is based on a maximum value of the magnitude of the spectral bin corresponding to the frequency of the ISF coefficient or the LSF coefficient and the magnitude of at least one neighboring spectral bin; and

to obtain a parameter associated with the mid-subframe from a quantized ISF coefficient or a quantized LSF coefficient of a current frame and a previous frame, based on the determined weighting function of the mid-subframe.

6. A method for enhancing a quantization efficiency in linear predictive encoding of speech and/or audio, the method comprising:

obtaining a line spectral frequency (LSF) coefficient or an immittance spectral frequency (ISF) coefficient of a mid-subframe of a signal of audio and/or speech from a linear predictive coding (LPC) coefficient of the mid-subframe;

determining a weighting function based on a magnitude of a spectral bin corresponding to a frequency of the ISF coefficient or the LSF coefficient of the mid-subframe, wherein the weighting function is based on a maximum value of the magnitude of the spectral bin corresponding to the frequency of the ISF coefficient or the LSF coefficient and the magnitude of at least one neighboring spectral bin; and

obtaining a parameter associated with the mid-subframe from a quantized ISF coefficient or a quantized LSF coefficient of a current frame and a previous frame, based on the determined weighting function of the mid-subframe.

7. The encoding method of claim 6, wherein the weighting function is based on a

spectral envelope of the signal.

8. The encoding method of claim 6, wherein the weighting function is varied depending on at least one of a bandwidth and a coding mode of the signal.

9. The encoding method of claim 6, wherein the weighting function is determined by combining a first weighting function based on the magnitude of the spectral bin corresponding to the ISF coefficient or the LSF coefficient and a second weighting function based on frequency information for the ISF coefficient or the LSF coefficient.