Claims

1. An apparatus for encoding an information signal including a plurality of frames, the apparatus comprising:

a first estimator configured to obtain a first estimate, the first estimate being an estimate of a pitch lag for a current frame, wherein the first estimate is obtained as the lag that maximizes a first correlation function associated to the current frame;

a second estimator configured to obtain a second estimate, the second estimate being another estimate of a pitch lag for the current frame, wherein the second estimator is conditioned by the pitch lag selected at the previous frame so as to obtain the second estimate for the current frame, wherein the second estimator is configured to obtain the second estimate by searching the lag which maximizes a second correlation function in a second subinterval which contains the pitch lag selected for the previous frame,

a selector configured to choose a selected value by performing a selection between the first estimate and the second estimate on the basis of a first and a second correlation measurements, wherein the selector is configured to perform a comparison between:

a downscaled version of a first normalized autocorrelation measurement associated to the current frame and obtained at a lag corresponding to the first estimate; and

a second normalized autocorrelation measurement associated to the current frame and obtained at a lag corresponding to the second estimate,

so as to select the first estimate when the second normalized autocorrelation measurement is less than the downscaled version of the first normalized autocorrelation measurement, and/or

to select the second estimate when the second normalized autocorrelation measurement is greater than the downscaled version of the first normalized autocorrelation measurement.

2. The apparatus of claim 1, further comprising:

a detection unit comprising the first estimator, the second estimator, and the selector; and

a long-term post filtering, LTPF, tool configured to encode data useful for performing LTPF at a decoder, the data useful for performing LTPF including the selected value.

3. The apparatus of claim 1, further comprising, downstream to the selector, a long term postfiltering, LTPF, tool for controlling a long term postfilter at a decoder apparatus.

4. The apparatus of any of the preceding claims, configured to compare the harmonicity of the selected value with a predetermined LTPF threshold, so as to avoid to encode the selected value in case the harmonicity of the selected value is below the predetermined threshold.

5. The apparatus of any of the preceding claims, wherein:

the second subinterval contains lags within a distance less than a pre-defined lag number threshold from the pitch lag selected for the previous frame.

6. The apparatus of any of the preceding claims, wherein the second estimator is configured to:

search for a maximum value among the second correlation function values to associate the second estimate to the lag associated to the maximum value among the second correlation function values.

7. The apparatus of any of the preceding claims, wherein the first correlation function is restricted to lags in a first subinterval.

8. The apparatus of claim 7, wherein the first subinterval contains a number of lags greater than the second subinterval, and/or at least some of the lags in the second subinterval are comprised in the first subinterval.

9. The apparatus of any of the preceding claims, wherein the first estimator is configured to:

weight the correlation measurement values of the first correlation function using a monotonically decreasing weight function before searching for the lag that maximizes the first correlation function.

10. The apparatus of any of the preceding claims, wherein the first estimator is configured to obtain the first estimate T_1 by performing at least some of the following operations:

$$T_1 = \underset{k=k_{min}\ldots k_{max}}{\operatorname{argmax}} \; R_w(k)$$

$$R_w(k) = R(k)w(k) \quad for \;\; k = k_{min}..k_{max}$$

$$w(k) = 1 - 0.5\frac{(k - k_{min})}{(k_{max} - k_{min})} \quad for \;\; k = k_{min}..k_{max}$$

$$R(k) = \sum_{n=0}^{N-1} x(n)x(n-k) \quad for \;\; k = k_{min}..k_{max}$$

$w(k)$ being a weighting function, k_{min} and k_{max} being associated to a minimum lag and a maximum lag, R being an autocorrelation measurement value estimated on the basis of the information signal or a processed version thereof and N being the frame length, x being the information signal.

11. The apparatus of any of the preceding claims, wherein the second estimator is configured to obtain the second estimate T_2 by performing:

$$T_2 = \underset{k=k'_{min}\ldots k'_{max}}{\operatorname{argmax}} \; R(k)$$

with $k'_{min} = \max(k_{min}, T_{prev} - \delta)$, $k'_{max} = \min(k_{max}, T_{prev} + \delta)$, T_{prev} being the selected estimate in the preceding frame, δ being a distance from T_{prev}, k_{min} and k_{max} being associated to a minimum lag and a maximum la, R being an autocorrelation measurement value estimated on the basis of the information signal or a processed version thereof.

12. The apparatus of any of the preceding claims, wherein the selector is configured to perform a selection of the pitch lag estimate T_{curr} in terms of

$$T_{curr} = \begin{cases} T_1 & \text{if normcorr}(x, N, T_2) \leq \alpha \text{normcorr}(x, N, T_1) \\ T_2 & \text{otherwise} \end{cases}$$

with T_1 being the first estimate, T_2 being the second estimate, x being a value of the information signal or a processed version thereof, normcorr(x, N, T) being the normalized correlation measurement of the signal x of length N at lag T, α being a downscaling coefficient.

13. The apparatus of any of the preceding claims, wherein the information signal is an audio signal.

14. The apparatus of any of the preceding claims, configured to obtain the first and second normalized autocorrelation measurements using the same correlation function up to a weighting function.

15. The apparatus of any of the preceding claims, configured to obtain the first normalized autocorrelation measurement as the normalized version of the first estimate up to a weighting function.

16. The apparatus of any of the preceding claims, configured to obtain the second normalized autocorrelation measurement as the normalized version of the second estimate.

17. The apparatus of any of the preceding claims, further comprising a transform coder configured to generate a representation of the information signal or a processed version thereof.

18. A system comprising an encoder side and a decoder side, the encoder side comprising the apparatus according to any of the preceding claims, the decoder side comprising a long term postfiltering tool controlled on the basis of the pitch lag estimate selected by the selector.

19. A method for determining a pitch lag for a signal divided into frames, comprising:

performing a first estimation for a current frame to obtain first estimate as the lag that maximizes a first correlation function associated to the current frame;

performing a second estimation for the current frame obtained by searching for the lag which maximizes a second correlation function in a second subinterval which contains the pitch lag selected for the previous frame, wherein performing the second estimation is obtained on the basis of the result of a selecting step performed at the previous frame; and

selecting between the first estimate obtained at the first estimation and the second estimate obtained at the second estimation on the basis of a first and a second normalized autocorrelation measurements,

wherein selecting includes performing a comparison between:

a downscaled version of the first normalized autocorrelation measurement , associated to the current frame and obtained at a lag corresponding to the first estimate;

the second normalized autocorrelation measurement , associated to the current frame and obtained at a lag corresponding to the second estimate; and

selecting the first estimate when the second normalized autocorrelation measurement is less than the downscaled version of the first normalized autocorrelation measurement, and/or selecting the second estimate when the second normalized autocorrelation measurement is greater than the downscaled version of the first normalized autocorrelation measurement.

20. The method of claim 19, further comprising using the selected lag for long term postfiltering, LTPF.

21. A method for encoding a bitstream for a signal divided into frames, comprising:

performing the method of claim 19 or 20; and

encoding data useful for performing LTPF at the decoder, the data useful for performing LTPF including the selected value.

22. The method of any of claims 19-21, further comprising using the selected lag for packet lost concealment, PLC.

23. A program comprising instructions which, when executed by a processor, cause the processor to perform a method according to any of claims 19-22.