CLAIMS

1. A system configured to generate a time stretched and/or frequency transposed signal from an input signal, the system comprising:

an analysis filter bank (101) configured to derive a number $Y \geq 1$ of analysis subband signals from the input signal, wherein each analysis subband signal comprises a plurality of complex-valued analysis samples, each having a phase and a magnitude;

a subband processing unit (102) configured to generate a synthesis subband signal from the Y analysis subband signals using a subband transposition factor Q and a subband stretch factor S, at least one of Q and S being greater than one, wherein the subband processing unit (102) comprises:

a block extractor (201) configured to:

i) form Y frames of L input samples, each frame being extracted from said plurality of complex-valued analysis samples in an analysis subband signal and the frame length being $L > 1$; and

ii) apply a block hop size of h samples to said plurality of analysis samples, prior to forming a subsequent frame of L input samples, thereby generating a sequence of frames of input samples;

a nonlinear frame processing unit (202) configured to generate, on the basis of Y corresponding frames of input samples formed by the block extractor, a frame of processed samples by determining a phase and magnitude for each processed sample of the frame, wherein, for at least one processed sample:

i) the phase of the processed sample is based on the respective phases of the corresponding input sample in each of the Y frames of input samples; and

ii) the magnitude of the processed sample is based on the magnitude of the corresponding input sample in each of the Y frames of input samples;

and

an overlap and add unit (204) configured to determine the synthesis subband signal by overlapping and adding the samples of a sequence of frames of processed samples;

and

a synthesis filter bank (103) configured to generate the time stretched and/or frequency transposed signal from the synthesis subband signal,

wherein the system is operable at least for $Y = 2$.

2. The system of claim 1, wherein

the analysis filter bank (101) is one of a quadrature mirror filter bank, a windowed discrete Fourier transform or a wavelet transform; and

the synthesis filter bank (103) is a corresponding inverse filter bank or transform.

3. The system of claim 2, wherein the analysis filter bank (101) is a 64-point quadrature mirror filter bank and the synthesis filter bank (103) is an inverse 64-point quadrature mirror filter bank.

4. The system of any one of the preceding claims, wherein:

the analysis filter bank (101) applies an analysis time stride Δt_A to the input signal;

the analysis filter bank has an analysis frequency spacing Δf_A;

the analysis filter bank has a number N of analysis subbands, with $N > 1$, where n is an analysis subband index with $n = 0,...,N-1$;

an analysis subband of the N analysis subbands is associated with a frequency band of the input signal;

the synthesis filter bank (103) applies a synthesis time stride Δt_S to the synthesis subband signal;

the synthesis filter bank has a synthesis frequency spacing Δf_S;

the synthesis filter bank has a number M of synthesis subbands, with $M > 1$, where m is a synthesis subband index with $m = 0,...,M-1$; and

a synthesis subband of the M synthesis subbands is associated with a frequency band of the time stretched and/or frequency transposed signal.

5. The system of claim 4, wherein the subband processing unit (102) is configured for $Y = 2$ and further comprises a cross processing control unit (404) configured to generate cross processing control data (403) defining subband indices n_1, n_2 associated with the analysis subband signals in such manner that the subband indices differ by an integer p approximating the ratio of a fundamental frequency Ω_0 of the input signal and the analysis frequency spacing Δf_A.

6. The system of claim 4, wherein the subband processing unit (102) is configured for $Y = 2$ and further comprises a cross processing control unit (404) configured to generate cross processing control data (403) defining subband indices n_1, n_2 associated with the analysis subband signals and the synthesis subband index m, which subband indices are related by being approximate integer solutions of

$$\begin{Bmatrix} m+\sigma = \dfrac{Q_\varphi \Omega + r\Omega_0}{\Delta f_S} \\ n_1+\sigma = \dfrac{\Omega}{\Delta f_A} \\ n_2+\sigma = \dfrac{\Omega+\Omega_0}{\Delta f_A} \end{Bmatrix},$$

where Ω_0 is a fundamental frequency of the input signal,

$\sigma = 0$ or 1/2,

$Q = \dfrac{\Delta t_S}{\Delta t_A} Q_\varphi$, and

r is an integer satisfying $1 \le r \le Q_\varphi - 1$.

7. The system of claim 6, wherein the cross processing control unit (404) is configured to generate processing control data such that the subband indices n_1, n_2 are based on a value of r which maximizes the minimum of the subband magnitudes of the two frames formed by extracting analysis samples from analysis subband signals.

8. The system of claim 7, wherein the subband magnitude of each frame of L input samples is the magnitude of a central or near-central sample.

9. The system of any one of the preceding claims, wherein the block extractor (201) is configured to derive at least one frame of input samples by downsampling the complex-valued analysis samples in an analysis subband signal.

10. The system of claim 9 configured for $Y = 2$, wherein the block extractor is configured to derive a first and second frame of input samples by downsampling the complex-valued analysis samples in a first and second analysis subband signal, respectively, by downsampling factors D_1 and D_2 satisfying $\begin{Bmatrix} Q = T_1 D_1 + T_2 D_2 \\ SQ = T_1 + T_2 \end{Bmatrix}$ and either $D_1 \ge 0$, $D_2 > 0$ or $D_1 > 0$, $D_2 \ge 0$,

and wherein the nonlinear frame processing unit (202) is configured to determine the phase of the processed sample based on a linear combination, with non-negative integer coefficients

T_1, T_2, of respective phases of the corresponding input sample in a first and second frame of input samples.

11. The system of any one of the preceding claims, wherein the subband processing unit (102) further comprises a windowing unit (203) upstream of the overlap and add unit (204) and configured to apply a finite-length window function to the frame of processed samples.

12. The system of claim 11, wherein the window function has a length which corresponds to the frame length L and the window function is one of a:

Gaussian window,
cosine window,
raised cosine window,
Hamming window,
Hann window,
rectangular window,
Bartlett window, and
Blackman window.

13. The system of claim 11, wherein the window function comprises a plurality of window samples, and wherein overlapped and added window samples of a plurality of window functions, when weighted by complex weights and shifted with a hop size of Sh, form a substantially constant sequence.

14. The system of claim 13, wherein consecutive complex weights differ only by a fixed phase rotation.

15. The system of claim 14, wherein the phase rotation is proportional to a fundamental frequency of the input signal.

16. The system of any one of the preceding claims, wherein the overlap and add unit (204) applies a hop size to consecutive frames of processed samples, the hop size being equal to the block hop size h times the subband stretch factor S.

17. The system of any one of the preceding claims, operable at least for $Y = 1$ and $Y = 2$.

18. The system of claim 17, operable for at least one further value $Y \geq 3$.

19. The system of any one of the preceding claims configured for $Y = 2$, wherein the frame processing unit (202) is configured to determine the magnitude of the processed sample as a mean value of the magnitude of the corresponding input sample in a first frame of input samples and the magnitude of the corresponding input sample in a second frame of input samples.

20. The system of claim 19, wherein the nonlinear frame processing unit (202) is configured to determine the magnitude of the processed sample as a weighted geometric mean value.

21. The system of claim 20, wherein the geometric magnitude weighting parameters are ρ and $1 - \rho$, where ρ is a real number inversely proportional to the subband transposition factor Q.

22. The system of any one of the preceding claims configured for $Y = 2$, wherein the non-linear frame processing unit (202) is configured to determine the phase of the processed sample based on a linear combination, with non-negative integer coefficients (T_1, T_2), of respective phases of the corresponding input sample in a first and second frame of input samples.

23. The system of claim 22, wherein the sum of said integer coefficients is the product $Q \times S$ of the stretch factor and the transposition factor.

24. The system of claim 22, wherein the phase of the processed sample corresponds to said linear combination of phases plus a phase correction parameter θ.

25. The system of any one of the preceding claims, wherein the block extractor (201) is configured to interpolate two or more analysis samples to derive an input sample.

26. The system of any one of the preceding claims, further comprising a control data reception unit configured to receive control data (104), wherein the subband processing unit (102) is configured to determine the synthesis subband signal by taking into account the control data.

27. The system of claim 26 configured for $Y = 2$, said control data (104) including a fundamental frequency Ω_0 of the input signal, wherein the subband processing unit (102) is configured to determine the analysis subbands, from which the processed samples are to be derived, in such manner that their frequency spacing is proportional to the fundamental frequency.

28. The system of any one of the preceding claims, wherein the non-linear processing unit (102) comprises:

a pre-normalizer (901, 902) configured to rescale the magnitudes of the corresponding input samples in at least one of the Y frames of input samples ($v_m = u_m / |u_m|^{\beta_m}$); and

a complex multiplier (910) configured to determine the processed sample by computing a weighted complex product $\left(\prod_{n \in N} u_n^{\gamma_n} \prod_{m \in M} v_m^{\gamma_m} \right)$ of factors equal to the corresponding input sample in at least two of the Y frames of input samples, at least one of the factors ($v_m, m \in M \neq \varnothing$) being derived from a sample with a magnitude rescaled by the pre-normalizer.

29. The system of any one of the preceding claims configured for $Y = 2$, comprising:

an analysis filter bank (101) configured to derive a first and a second analysis subband signal from the input signal;

a subband processing unit (102) configured to determine a synthesis subband signal from the first and second analysis subband signals, wherein the subband processing unit (102) comprises:

a first block extractor (301-1) configured to:

i) form a first frame of L input samples from said plurality of complex-valued analysis samples in the first analysis subband signal, the frame length being $L > 1$; and

ii) apply a block hop size of h samples to said plurality of analysis samples, prior to forming a subsequent frame of L input samples, thereby generating a first sequence of frames of input samples;

a second block extractor (301-2) configured to:

i) form a second frame of L input samples from said plurality of complex-valued analysis samples in the second analysis subband signal; and

ii) apply the block hop size of h samples to said plurality of analysis samples, prior to forming a subsequent frame of L input samples, thereby generating a second sequence of frames of input samples;

a nonlinear frame processing unit (302) configured to generate, on the basis of the first and second frames of input samples, a frame of processed samples; and

an overlap and add unit (204) configured to form the synthesis subband signal;

and

a synthesis filter bank (103) configured to generate the time stretched and/or frequency transposed signal from the synthesis subband signal.

30. The system of any one of the preceding claims, further comprising:

a plurality of subband processing units (401, 402; 503; 602-2, 602-3, 602-4), each configured to determine an intermediate synthesis subband signal using a different value of the subband transposition factor Q and/or of the subband stretch factor S; and

a merging unit (405; 603) arranged downstream of said plurality of subband processing units and upstream of the synthesis filter bank (103) configured to merge corresponding intermediate synthesis subband signals in order to determine the synthesis subband signal.

31. The system of claim 30, further comprising:

a core decoder (501) arranged upstream of the analysis filter bank (101) configured to decode a bit stream into the input signal; and

an high-frequency reconstruction, HFR, processing unit (504) arranged downstream of the merging unit (405; 603) and upstream of the synthesis filter bank (103; 505) configured to apply spectral band information derived from the bit stream to the synthesis subband signal, such as by performing spectral shaping of the synthesis subband signal.

32. The system of claim 30, wherein at least one of the subband processing units is a direct subband processing unit (401), which is configured to determine one synthesis subband signal from one analysis subband signal using a subband transposition factor Q and a subband stretch factor S, and at least one is a cross subband processing unit (402), which is configured to determine one synthesis subband signal from two analysis subband signals using a subband transposition factor Q and a subband stretch factor S, which are independent of the first two factors.

33. The system of claim 32 configured for $Y = 2$, wherein:

the analysis filter bank (101) applies an analysis time stride Δt_A to the input signal;

the analysis filter bank has an analysis frequency spacing Δf_A;

the analysis filter bank has a number N of analysis subbands, with $N > 1$, where n is an analysis subband index with $n = 0,\ldots,N-1$; an analysis subband of the N analysis subbands is associated with a frequency band of the input signal;

the synthesis filter bank (103) applies a synthesis time stride Δt_S to the synthesis subband signal;

the synthesis filter bank has a synthesis frequency spacing Δf_S;

the synthesis filter bank has a number M of synthesis subbands, with $M > 1$, where m is a synthesis subband index with $m = 0,..., M-1$; and

a synthesis subband of the M synthesis subbands is associated with a frequency band of the time stretched and/or frequency transposed signal,

said system being configured to deactivate at least one cross subband processing unit (402) if, for a given synthesis subband, one of the following conditions is satisfied:

a) the ratio of the magnitude M_S of the direct source term analysis subband yielding the synthesis subband and the least magnitude M_C in an optimal pair of cross source terms yielding the synthesis subband is greater than a predetermined constant q;

b) the synthesis subband has a significant contribution from a direct processing unit;

c) a fundamental frequency Ω_0 is smaller than the analysis filter bank spacing Δf_A.

34. The system of any one of the preceding claims, wherein:

the analysis filter bank (101) is configured to form $Y \times Z$ analysis subband signals from the input signal;

the subband processing unit (102) is configured to generate Z synthesis subband signals from the $Y \times Z$ analysis subband signals, applying a pair of S and Q values for each group of Y analysis subband signals on which one synthesis subband signal is based; and

the synthesis filter bank (103) is configured to generate Z time stretched and/or frequency transposed signals from the Z synthesis subband signals.

35. A method for generating a time stretched and/or frequency transposed signal from an input signal, the method comprising:

deriving a number $Y \geq 2$ of analysis subband signals from the input signal, wherein each analysis subband signal comprises a plurality of complex-valued analysis samples, each having a phase and a magnitude;

forming Y frames of L input samples, each frame being extracted from said plurality of complex-valued analysis samples in an analysis subband signal and the frame length being $L > 1$;

applying a block hop size of h samples to said plurality of analysis samples, prior to deriving a subsequent frame of L input samples, thereby generating a sequence of frames of input samples;

generating, on the basis of Y corresponding frames of input samples, a frame of processed samples by determining a phase and a magnitude for each processed sample of the frame, wherein, for at least one processed sample:

i) the phase of the processed sample is based on the respective phases of the corresponding input sample in each of the Y frames of input samples; and

ii) the magnitude of the processed sample is based on the magnitude of the corresponding input sample in each of the Y frames of input samples;

determining the synthesis subband signal by overlapping and adding the samples of a sequence of frames of processed samples; and

generating the time stretched and/or frequency transposed signal from the synthesis subband signal.

36. The method of claim 35, wherein a frame of processed samples is based on $Y = 2$ corresponding frames of input samples, which are formed by extracting samples from two analysis subband signals representing frequencies that differ approximately by a fundamental frequency Ω_0 of the input signal.

37. The method of claim 35 or 36, wherein:

a frame of processed samples is based on $Y = 2$ corresponding frames of input samples, which are formed by extracting samples from two analysis subband signals approximately representing frequencies Ω and $\Omega + \Omega_0$; and

the synthesis subband signal approximately represents a frequency $Q_\varphi + r\Omega_0$, where r is an integer satisfying $1 \le r \le Q_\varphi - 1$ and $Q = \frac{\Delta t_S}{\Delta t_A} Q_\varphi$, where Δt_A and Δt_S are analysis and synthesis time strides, respectively.

38. The method of claim 37, wherein the frequency Ω is selected in order to maximize the smaller of the subband magnitudes of the two frames of input samples extracted from analysis subband signals representing frequencies Ω and $\Omega + \Omega_0$.

39. The method of claim 38, wherein the subband magnitude of a frame of input samples is the magnitude of a central or near-central sample.

40. The method of any one of claims 35 to 39, wherein said forming frames of input samples includes downsampling complex-valued analysis samples in an analysis subband signal.

41. The method of claim 40, wherein:

a frame of processed samples is based on $Y = 2$ corresponding frames of input samples;

a first frame of input samples is extracted from samples in a first analysis subband signal while applying a downsampling factor D_1;

a second frame of input samples is extracted from samples in a second analysis sub-band signal while applying a downsampling factor D_2;

the downsampling factors satisfy $\begin{Bmatrix} Q = T_1 D_1 + T_2 D_2 \\ SQ = T_1 + T_2 \end{Bmatrix}$ and either $D_1 \geq 0$, $D_2 > 0$ or $D_1 > 0$, $D_2 \geq 0$; and

the phase of the processed sample is based on a linear combination, with non-negative integer coefficients T_1, T_2, of respective phases of the corresponding input sample in a first and second frame of input samples.

42. The method of any one of claims 35 to 41, wherein said determining the synthesis sub-band signal further comprises applying a finite-length window function to each frame in the sequence of frames of processed samples prior to overlapping and adding them.

43. The method of claim 42, wherein the window function has a length which corresponds to the frame length L and the window function is one of a:

Gaussian window,
cosine window,
raised cosine window,
Hamming window,
Hann window,
rectangular window,
Bartlett window, and
Blackman window.

44. The method of claim 42, wherein the window function comprises a plurality of window samples, and wherein overlapped and added window samples of a plurality of window functions, when weighted by complex weights and shifted with a hop size of Sh, form a substantially constant sequence.

45. The method of claim 44, wherein consecutive complex weights differ only by a fixed phase rotation.

46. The method of claim 45, wherein the phase rotation is proportional to a fundamental frequency of the input signal.

47. The method of any one of claims 35 to 46, wherein said determining the synthesis subband signal includes overlapping consecutive frames of processed samples by applying a hop size equal to the block hop size h times the subband stretch factor S.

48. The method of any one of claims 35 to 47, wherein:

a frame of processed samples is based on $Y = 2$ corresponding frames of input samples; and

the magnitude of the processed sample is determined as a mean value of the magnitude of the corresponding input sample in a first frame of input samples and the magnitude of the corresponding input sample in a second frame of input samples.

49. The method of claim 48, wherein said mean value of magnitudes is a weighted geometric mean value.

50. The method of claim 49, wherein geometric magnitude weighting parameters are ρ and $1 - \rho$, where ρ is a real number inversely proportional to the subband transposition factor Q.

51. The method of any one of claims 35 to 50, wherein:

a frame of processed samples is based on $Y = 2$ corresponding frames of input samples; and

wherein the phase of the processed sample is determined as a linear combination, with non-negative integer coefficients (T_1, T_2), of respective phases of the corresponding input sample in a first and second frame of input samples.

52. The method of claim 51, wherein the sum of said non-negative integer coefficients is the product $Q \times S$ of the stretch factor and the transposition factor.

53. The method of claim 51, wherein the phase of the processed sample corresponds to said linear combination plus a phase correction parameter θ.

54. The method of any one of claims 35 to 53, wherein at least one input sample is derived by interpolating two or more analysis samples.

55. The method of any one of claims 35 to 54, further comprising receiving control data to be taken into account in said generating a frame of processed samples.

56. The method of claim 55, wherein:

a frame of processed samples is based on $Y = 2$ corresponding frames of input samples;

said control data include a fundamental frequency Ω_0 of the input signal; and

the two analysis subbands, from which the input samples in each frame are extracted, represent frequencies differing by the fundamental frequency.

57. The method of any one of claims 35 to 56, wherein said generating a frame of processed samples comprises:

rescaling a magnitude of at least one input sample; and

computing a processed sample as a weighted complex product $\left(\prod_{n\in N} u_n^{\gamma_n} \prod_{m\in M} v_m^{\gamma_m}\right)$ of factors equal to the corresponding input sample in a t least two of the Y frames of input samples, wherein at least one of the factors ($v_m = u_m / |u_m|^{\beta}, m \in M \neq \varnothing$) is an input sample with a rescaled magnitude.

58. The method of any one of claims 35 to 57, comprising generating a plurality of intermediate synthesis subband signals, wherein each is generated on the basis of a plurality of corresponding frames of input samples and using a different value of the subband transposition factor Q and/or of the subband stretch factor S,

wherein said determining the synthesis subband signal includes merging corresponding intermediate synthesis subband signals.

59. The method of claim 58, further comprising:

decoding a bit stream to obtain the input signal, from which the analysis subband signals are to be derived; and

applying spectral band information derived from the bit stream to the synthesis subband signal, such as by performing spectral shaping of the synthesis subband signal.

60. The method of claim 58, wherein at least one of the intermediate synthesis subband signals is generated by direct subband processing, on the basis of one analysis subband signal and using a subband transposition factor Q and a subband stretch factor S, and at least one of the intermediate synthesis subband signals is generated by cross-product processing, on the basis of two analysis subband signals using a subband transposition factor Q and a subband stretch factor S, which factors are independent of the first two factors.

61. The method of claim 60, wherein said generating an intermediate synthesis subband signal by cross-product processing is suspended responsive to one of the following conditions being satisfied:

a) the ratio of the magnitude M_S of the direct source term analysis subband yielding the synthesis subband and the least magnitude M_C in an optimal pair of cross source terms yielding the synthesis subband is greater than a predetermined constant q;

b) the synthesis subband has a significant contribution from a direct processing unit;

c) a fundamental frequency Ω_0 is smaller than the analysis filter bank spacing Δf_A.

62. The method of any one of claims 35 to 61, wherein:

$Y \times Z$ analysis subband signals are derived;

$Y \times Z$ frames of input samples are formed;

$Y \times Z$ corresponding frames of input samples are used to generate Z frames of processed samples;

Z synthesis subband signals are determined; and

Z time stretched and/or frequency transposed signals are generated.

63. A data carrier storing computer-readable instructions for performing the method set forth in any one of claims 35 to 62.

CLAIMS

1. A system configured to generate a time stretched and/or frequency transposed signal from an input signal, the system comprising:

an analysis filter bank configured to derive a number $Y \geq 1$ of analysis subband signals from the input signal, wherein each analysis subband signal comprises a plurality of complex-valued analysis samples, each having a phase and a magnitude;

a subband processing unit configured to generate a synthesis subband signal from the Y analysis subband signals using a subband transposition factor Q and a subband stretch factor S, at least one of Q and S being greater than one, wherein the subband processing unit comprises:

a block extractor configured to:

i) form Y frames of L input samples, each frame being extracted from said plurality of complex-valued analysis samples in an analysis subband signal and the frame length being $L > 1$; and

ii) apply a block hop size of h samples to said plurality of analysis samples, prior to forming a subsequent frame of L input samples, thereby generating a sequence of frames of input samples;

a nonlinear frame processing unit configured to generate, on the basis of Y corresponding frames of input samples formed by the block extractor, a frame of processed samples by determining a phase and magnitude for each processed sample of the frame, wherein, for at least one processed sample:

i) the phase of the processed sample is based on the respective phases of the corresponding input sample in each of the Y frames of input samples; and

ii) the magnitude of the processed sample is determined as a mean value of the magnitude of the corresponding input sample in a first frame of the Y frames of input samples and the magnitude of the corresponding input sample in a second frame of the Y frames of input samples;

and

an overlap and add unit configured to determine the synthesis subband signal by overlapping and adding the samples of a sequence of frames of processed samples;

and

a synthesis filter bank configured to generate the time stretched and/or frequency transposed signal from the synthesis subband signal, wherein the system is operable at least for $Y = 2$.

2. The system of claim 1, wherein

the analysis filter bank is one of a quadrature mirror filter bank, a windowed discrete Fourier transform or a wavelet transform; and

the synthesis filter bank is a corresponding inverse filter bank or transform.

3. The system of claim 1, wherein:

the analysis filter bank applies an analysis time stride Δt_A to the input signal;

the analysis filter bank has an analysis frequency spacing Δf_A;

the analysis filter bank has a number N of analysis subbands, with $N > 1$, where n is an analysis subband index with $n = 0,...,N-1$;

an analysis subband of the *N* analysis subbands is associated with a frequency band of the input signal;

the synthesis filter bank applies a synthesis time stride Δt_S to the synthesis subband signal;

the synthesis filter bank has a synthesis frequency spacing Δf_S;

the synthesis filter bank has a number M of synthesis subbands, with $M > 1$, where m is a synthesis subband index with $m = 0,...,M-1$; and

a synthesis subband of the *M* synthesis subbands is associated with a frequency band of the time stretched and/or frequency transposed signal, wherein the subband processing unit is configured for $Y = 2$ and further comprises a cross processing control unit configured to generate cross processing control data defining subband indices n_1, n_2 associated with the analysis subband signals in such manner that the subband indices differ by an integer *p* approximating the ratio of a fundamental frequency Ω_0 of the input signal and the analysis frequency spacing Δf_A.

4. The system of claim 3, wherein the subband indices n_1, n_2 are associated with the analysis subband signals and the synthesis subband index *m,* which subband indices are

related by being approximate integer solutions of

$$\left\{ \begin{array}{l} m+\sigma = \dfrac{Q_\varphi \Omega + r\Omega_0}{\Delta f_S} \\ n_1+\sigma = \dfrac{\Omega}{\Delta f_A} \\ n_2+\sigma = \dfrac{\Omega+\Omega_0}{\Delta f_A} \end{array} \right\},$$

where Ω_0 is a fundamental frequency of the input signal,

$\sigma = 0$ or 1/2,

$$Q = \frac{\Delta t_S}{\Delta t_A} Q_\varphi,$$

Q_φ is a transposition factor, and

r is an integer satisfying $1 \le r \le Q_\varphi - 1$.

5. The system of claim 4, wherein the cross processing control unit is configured to generate processing control data such that the subband indices n_1, n_2 are based on a value of r which maximizes the minimum of the subband magnitudes of the two frames formed by extracting analysis samples from analysis subband signals.

6. The system of claim 1, wherein the block extractor is configured to derive at least one frame of input samples by downsampling the complex-valued analysis samples in an analysis subband signal.

7. The system of claim 1, wherein the subband processing unit further comprises a windowing unit upstream of the overlap and add unit and configured to apply a window function of a length which corresponds to the frame length L to the frame of processed samples , and wherein optionally the window function is one of a:

Gaussian window,

cosine window,

raised cosine window,

Hamming window,

Hann window,

rectangular window,

Bartlett window, and

Blackman window.

8. The system of claim 7, wherein the window function comprises a plurality of window samples, and wherein overlapped and added window samples of a plurality of window functions, when weighted by complex weights and shifted with a hop size of Sh, form a substantially constant sequence.

9. The system of claim 1, operable at least for $Y = 1$ and $Y = 2$.

10. The system of claim 1, wherein the mean value is a weighted geometric mean value, and the geometric magnitude weighting parameters are ρ and 1 – ρ, where ρ is a real number inversely proportional to the subband transposition factor Q.

11. The system of claim 1 configured for $Y = 2$, wherein the nonlinear frame processing unit is configured to determine the phase of the processed sample based on a linear combination, with non-negative integer coefficients (T_1, T_2), of respective phases of the corresponding input sample in a first and second frame of input samples.

12. The system of claim 11, wherein the phase of the processed sample corresponds to said linear combination of phases plus a phase correction parameter θ.

13. The system of claim 1, further comprising a control data reception unit configured to receive control data, wherein the subband processing unit is configured to determine the synthesis subband signal by taking into account the control data.

14. The system of claim 13 configured for $Y = 2$, said control data including a fundamental frequency Ω_0 of the input signal, wherein the subband processing unit is configured to determine the analysis subbands, from which the processed samples are to be derived, in such manner that their frequency spacing is proportional to the fundamental frequency.

15. The system of claim 1, wherein the non-linear processing unit comprises:

a pre-normalizer configured to rescale the magnitudes of the corresponding input samples in at least one of the Y frames of input samples ($v_m = u_m / |u_m|^{\beta_m}$); and

a complex multiplier configured to determine the processed sample by computing a weighted complex product $\left(\prod_{n\in N} u_n^{\gamma_n} \prod_{m\in M} v_m^{\gamma_m}\right)$ of factors equal to the corresponding input sample in at least two of the *Y* frames of input samples, at least one of the factors ($v_m, m\in M \neq \varnothing$) being derived from a sample with a magnitude rescaled by the pre-normalizer.

16. The system of claim 1 configured for $Y = 2$, comprising:

an analysis filter bank configured to derive a first and a second analysis subband signal from the input signal;

a subband processing unit configured to determine a synthesis subband signal from the first and second analysis subband signals, wherein the subband processing unit comprises:

a first block extractor configured to:

i) form a first frame of *L* input samples from said plurality of complex-valued analysis samples in the first analysis subband signal, the frame length being $L > 1$; and

ii) apply a block hop size of *h* samples to said plurality of analysis samples, prior to forming a subsequent frame of *L* input samples, thereby generating a first sequence of frames of input samples;

a second block extractor configured to:

i) form a second frame of *L* input samples from said plurality of complex-valued analysis samples in the second analysis subband signal; and

ii) apply the block hop size of *h* samples to said plurality of analysis samples, prior to forming a subsequent frame of *L* input samples, thereby generating a second sequence of frames of input samples;

a nonlinear frame processing unit configured to generate, on the basis of the first and second frames of input samples, a frame of processed samples;

and

an overlap and add unit configured to form the synthesis subband signal;

and

a synthesis filter bank configured to generate the time stretched and/or frequency transposed signal from the synthesis subband signal.

17. The system of claim 1, further comprising:

a plurality of subband processing units, each configured to determine an intermediate synthesis subband signal using a different value of the subband transposition factor Q and/or of the subband stretch factor S; and

a merging unit arranged downstream of said plurality of subband processing units and upstream of the synthesis filter bank configured to merge corresponding intermediate synthesis subband signals in order to determine the synthesis subband signal.

18. The system of claim 17 configured for $Y = 2$, wherein at least one of the subband processing units is a direct subband processing unit, which is configured to determine one synthesis subband signal from one analysis subband signal using a subband transposition factor Q and a subband stretch factor S, and at least one is a cross subband processing unit, which is configured to determine one synthesis subband signal from two analysis subband signals using a subband transposition factor Q and a subband stretch factor S, which are independent of the first two factors,

said system being configured to deactivate at least one cross subband processing unit if, for a given synthesis subband, one of the following conditions is satisfied:

a) the ratio of the magnitude M_S of the direct source term analysis subband yielding the synthesis subband and the least magnitude M_C in an optimal pair of cross source terms yielding the synthesis subband is greater than a predetermined constant q;

b) the synthesis subband has a significant contribution from a direct processing unit;

c) a fundamental frequency Ω_0 is smaller than the analysis filter bank spacing Δf_A.

19. The system of claim 1, wherein:

the analysis filter bank is configured to form $Y \times Z$ analysis subband signals from the input signal;

the subband processing unit is configured to generate Z synthesis subband signals from the $Y \times Z$ analysis subband signals, applying a pair of S and Q values for each group of Y analysis subband signals on which one synthesis subband signal is based; and

the synthesis filter bank is configured to generate Z time stretched and/or frequency transposed signals from the Z synthesis subband signals.

20. A method for generating a time stretched and/or frequency transposed signal from an input signal, the method comprising:

deriving a number $Y \geq 2$ of analysis subband signals from the input signal, wherein each analysis subband signal comprises a plurality of complex-valued analysis samples, each having a phase and a magnitude;

forming Y frames of L input samples, each frame being extracted from said plurality of complex-valued analysis samples in an analysis subband signal and the frame length being $L > 1$;

applying a block hop size of h samples to said plurality of analysis samples, prior to deriving a subsequent frame of L input samples, thereby generating a sequence of frames of input samples;

generating, on the basis of Y corresponding frames of input samples, a frame of processed samples by determining a phase and a magnitude for each processed sample of the frame, wherein, for at least one processed sample:

i) the phase of the processed sample is based on the respective phases of the corresponding input sample in each of the Y frames of input samples; and

ii) the magnitude of the processed sample is determined as a mean value of the magnitude of the corresponding input sample in a first frame of the Y frames of input samples and the magnitude of the corresponding input sample in a second frame of the Y frames of input samples;

determining the synthesis subband signal by overlapping and adding the samples of a sequence of frames of processed samples; and

generating the time stretched and/or frequency transposed signal from the synthesis subband signal.

21. A data carrier storing computer-readable instructions for performing the method set forth in claim 20.