Description

The invention relates to a method, a coder and a decoder for the transmission and for the compatible reception of standardized television signals.

For the introduction of a 16:9 wide screen format in existing television standards (for example PAL, SECAM, NTSC) with the 4:3 format, the so-called "letterbox" method is discussed ("Verbesserungsmöglichkeiten und Entwicklungstendenzen bei PAL" [Improvement options and development trends for PAL], G. Holoch, Paper FKTG 17.01.89 in Berlin and "Künftige Fernsehsysteme" [Future television systems], F. Müller-Römer, Fernseh- und Kinotechnik, 43rd year, No. 6/1989 and "Die neuen Wege des alten PAL" [The new paths of the old PAL], Dr. A. Ziemer, E. Matzel, Funkschau No. 18/1989). In this method, the entire picture information of the 16:9 recording is presented in a compatible manner on the 4:3 receiver with strips, which are filled with not through visible [sic] picture content, at the upper and lower edges of the picture.

This is done, in the studio starting with a 16:9 picture having 625 lines, for example, by extracting every fourth line from the 575 active lines in the frame and transmitting specific lines as additional information in the strips remaining as a result above and below the active picture. The active picture in the 4:3 receiver then comprises 431 lines and the edge strips each comprise 72 lines. This way of presenting, for example, feature films having the 16:9 format in the 4:3 receiver has, moreover, been customary to date and does not require any re-familiarization on the part of the viewer.

Since the ratio of the two picture formats corresponds to the ratio of the original number of lines to the reduced number of lines, the geometry distortion as a result of extracting the lines is compensated for again. The 16:9 receiver now evaluates the information from the two edge strips in order to raise the number of active lines, which was reduced to 431, to 575 once more

and thus to produce a full format 16:9 picture.

However, when every fourth line is extracted from the 575 active lines in the frame, signal step changes are produced in the 4:3 receiver, these becoming particularly visible at diagonal or moving structures in the picture content. In order to avoid signal step changes, the lines can also be vertically interpolated in the transmitter. However, this normally results in a reduction in the vertical definition in the 4:3 receiver.

In order that the picture content of the lines in the edge strips does not appear in a disturbing manner at the 4:3 receiver, the amplitude of this picture content is reduced by approximately 13 dB in the transmitter and correspondingly increased in the 16:9 receiver. However, this can result in significantly greater noise in the 16:9 receiver and thus in a deterioration of the picture quality in comparison with a contemporary 4:3 receiver.

In "Compatible HDTV coding for broadband ISDN", K.H. Tzou et al., IEEE Global Telecommunications Conference & Exhibition, Hollywood, 28.11.88, Volume 2, pages 24.1.1 - 24.1.7, a method for the digital coding and transmission of EQTV signals in ISDN networks is described, in which, with the aid of a two-dimensional DCT, the EQTV picture is extracted with reduced definition from an HDTV picture, is digitally coded and transmitted with reduced data. Additional items of information which can be used to reconstruct the HDTV picture again in a high-definition ISDN receiver are transmitted in an additional channel. In this case, picture parts of a 16:9 format which go beyond the 4:3 format are likewise transmitted in the additional channel.

A 4:3 EQTV receiver in this case reproduces only part of the 16:9 picture content.

The invention is based on the object of specifying a compatible transmission system for a 16:9 television signal with the use of a standard television channel, which system supplies pictures in the letterbox format with 4:3 standard television receivers and pictures in the 16:9 format with improved 16:9 television

receivers, in particular with a vertical definition which corresponds to the original signal and with a low noise level.

This object is achieved by means of the features specified in Claim 1. Advantageous developments of the invention are specified in the subclaims.

First of all, at the transmitter end, the television signal with the 575 active lines of the 16:9 picture is digitized and specially filtered in the vertical direction in the frame. This can be done, for example, by means of a DCT transform (DCT: discrete cosine transform) having a length of eight.

Of the eight coefficients produced in each case, the first to fifth are respectively combined with the eighth. These six coefficients are subjected to an inverse DCT transform having a length of six, undergo digital-to-analog conversion and are inserted at the corresponding position in the compressed 16:9 picture. As a result, the 4:3 receiver has virtually the complete vertical definition. The sixth and seventh coefficients likewise undergo digital-to-analog conversion and are transmitted in the strips above and below the compressed 16:9 picture.

A 4:3 receiver does not evaluate the coefficients in the two strips, but rather presents the television signal as in the above-described "letterbox" method. Since a DCT transform has the property of concentrating the signal energy in the low-order coefficients, the sixth and seventh coefficients generally have only a small amplitude. As a result, the visibility of any disturbing picture content in the strips in a 4:3 standard receiver is reduced from the outset. It suffices to perform no reduction, or only slight reduction, of these signal components. Virtually no increase in noise occurs, advantageously, as a result in the 16:9 receiver.

Instead of a linear reduction, the amplitudes of the coefficients in the strips can be reduced using a non-linear function and increased in a correspondingly inverse way in the 16:9 receiver, in order to reduce

their visibility in the 4:3 receiver even further. As a result of the non-linearity of the reduction and increase (larger amplitudes are reduced to a greater extent than smaller amplitudes), any increase in noise in the 16:9 receiver is even less than in the case of a linear reduction and increase.

An improved receiver having a picture format of 16:9 contains a decoder which evaluates the additional information from the two edge strips and supplies a full format 16:9 picture. To this end, the received television signal is digitized and subjected vertically in the frame to a DCT transform having a length of six, the respective sixth coefficient is shifted to the eighth position, the respectively associated sixth and seventh coefficients from the edge strips are inserted at the sixth and seventh positions, the original eight DCT coefficients recovered in this way are subjected to an inverse DCT transform and inserted at the position corresponding to that in the original signal. After subsequent digital-to-analog conversion, the 16:9 picture is available with complete vertical definition and noise which is increased only insignificantly.

An exemplary embodiment of the invention is explained below with reference to the drawings, in which

Fig. 1 shows a picture in the 16:9 format

Fig. 2 shows the picture of Fig. 1 with a vertically compressed active part and additional information in the two edge parts (known)

Fig. 3 shows a representation of the active part of the picture of Fig. 2 in the 4:3 receiver (known)

Fig. 4 shows a block diagram of a 16:9 coder

Fig. 5 shows a block diagram of a 16:9 decoder

Fig. 6 shows a dark picture part moving in the horizontal direction against a light background

Fig. 7 shows the average energy distribution in the coefficients of a DCT having a length of eight

Fig. 8 shows the energy distribution of the coefficients in the compressed video signal with a dynamic picture content.

Fig. 1 shows a television picture in the 16:9 picture format, such as is produced in a 16:9 studio, with a circle.

Figure 2 shows how the television picture of Fig. 1 is vertically compressed in the area 20 in a known 16:9 coder. From the 575 active lines in Fig. 1, 431 lines are produced as active picture part 20 for a 4:3 receiver by means of vertical compression by a factor of 4/3. This compression is performed by removing every fourth line from the picture of Fig. 1 or by vertical interpolation. The geometry of the circle has changed as a result of the compression. The lines removed from the picture part 20, or the lines required for decoding in the 16:9 receiver, are transmitted as an additional signal in the two edge strips 21 and 22.

Fig. 3 shows that a 4:3 receiver reproduces the active part 20 of the picture of Fig. 2 in the area 30. The original geometry of the circle of Fig. 1 is re-established by horizontal compression of the 16:9 format to the 4:3 format by a factor of 4/3. The complete picture content of Fig. 1 is available to a viewer, but with reduced vertical definition and with black strips 31 and 32 at the upper and lower edges of the picture. In order that the additional signal contained in the strips does not become visible in a disturbing manner, it must be correspondingly reduced in its amplitude in the 16:9 coder and be in the blacker than black region (between the sync level and the black level).

However, extensive reduction of the additional signal results in a worse signal-to-noise ratio in the 16:9 receiver because of the superimposed channel noise. This additional noise is contained in the space domain in the video signal.

In a 16:9 receiver, the additional signal in the edge strips 31 and 32 is correspondingly amplified and, together with the active picture part 30, in conjunction with the horizontal 16:9 expansion, forms a picture as in Fig. 1.

Fig. 6 shows a dark picture part which moves in

the horizontal direction against a light background. Since the fields represent different movement phases in the interlacing method, corresponding edges have a comb structure. If every fourth line is now extracted, for example, from such a comb structure, clearly visible interference patterns are produced in a 4:3 receiver. In order to avoid this, an "accurate" display can be achieved in the 4:3 receiver using vertical interpolation filters. However, higher vertical spectral components are clipped as a result of this; they are missing during decoding in the 16:9 receiver and result in reduced vertical definition.

It is evident from the comb structure that, for a good picture quality in the vertical direction, the highest possible frequencies have to be transmitted both in the 16:9 receiver (Fig. 6a) and in the compressed signal (Fig. 6b) for the 4:3 receiver.

This condition can be met using a suitable vertical transform, for example using a DCT.

Fig. 7 shows the absolute value 72 of an average energy content 73 of vertical transform coefficients as a function of the frequency 71. In the case of a comb structure such as in Fig. 6a, the highest spectral components 74 have a considerably increased absolute value, because the basic pattern of the eighth coefficient likewise has such a structure.

In the case of a DCT having a length of eight, the spectral component 74 is represented by the eighth coefficient. The value eight becomes the value six as a result of compression by a factor of 4/3. If the sixth and seventh DCT coefficients are removed from the eight DCT coefficients and the eighth is put at the position of the sixth, in the case of an inverse transform a comb structure such as in Fig. 6b is produced. A DCT having a length of eight becomes a DCT having a length of six.

Fig. 8 shows the corresponding spectrum of such a DCT having a length of six. The sixth and seventh coefficient, respectively, is transmitted as an additional signal in the strips 21 and 22. Their absolute

values are advantageously compressed non-linearly and expanded in a correspondingly inverse way in the 16:9 receiver, in order to achieve a better signal-to-noise ratio.

The 4:3 receiver does not evaluate these additional signals. Since statistically on average the absolute values of the higher-order DCT coefficients are significantly smaller than the lower-order DCT coefficients, as also shown in Fig. 7, a reduction of their levels in order to avoid becoming visible in the 4:3 receiver is unnecessary or only slightly necessary.

The coefficients in the edge strips advantageously do not represent video signals in the space domain, as in the known method, but rather spectral values of higher frequencies which a viewer perceives as radiofrequency noise. Such noise naturally disturbs a viewer less than an additional picture content which is presented with distortion.

Fig. 4 shows the block diagram of a 16:9 coder. The television signals, arriving, for example, from a camera, in the 16:9 format undergo analog-to-digital conversion 41 and are written to a memory 42. The samples in each case of eight vertically overlying pixels are consecutively read from the memory 42 and subjected to a DCT transform in the circuit 43. The sixth and seventh DCT coefficients are each sorted in the circuit 44 and non-linearly compressed in the circuit 46. This can be done, for example, according to the function $y=x^{1/3}$, x representing the input signal and y representing the output signal. The first to fifth DCT coefficients are respectively combined with the eighth DCT coefficient in the circuit 44 and subjected to an inverse DCT transform having a length of six in the circuit 45. The output signals of the circuits 45 and 46 are read into the memory 47 and output via the digital-to-analog converter 48 as an analog, compatible television signal in the 4:3 format.

Fig. 5 shows the block diagram of a corresponding 16:9 decoder in the 16:9 receiver. The signals in the 4:3

format initially undergo analog-to-digital conversion in the circuit 51 and are written to the memory 52. The samples in each case of six overlying pixels are read from the memory 52 and subjected to a DCT transform having a length of six in the circuit 53. The respectively associated sixth and seventh coefficients are passed by the memory 52 into the circuit 54 and non-linearly expanded in an inverse way with respect to the function of the circuit 46, that is to say with $y=x^3$. In the circuit 55, the sixth of the DCT-transformed coefficients is displaced to the position originally of the eighth, and the sixth and seventh coefficients in the circuit 54 are displaced to the sixth and seventh position. The original eight DCT coefficients recovered in this way are subjected to an inverse DCT transform in the circuit 56 and are written to the memory 57. They are output from the memory 57, via the digital-to-analog converter 58, as an analog television signal in the 16:9 format.

For television systems with different numbers of lines, the numbers are changed accordingly. For a television system with 525 lines or 481 active lines, the edge strips 21 and 22 can each contain 60 lines and the area 20 can contain 361 lines, for example.

This improved "letterbox" method has the following advantages:

- The picture quality of the compatible 4:3 television signal is better. Movement phase reversals and step changes caused by altered scanning do not occur.
- The vertical definition of the compatible receiver, in particular the static definition, is retained.
- The picture of the 16:9 receiver is less susceptible to noise added in the transmission channel, because the noise essentially affects only higher-order spectral values.
- Since all of the DCT coefficients are transmitted virtually unchanged, the 16:9 receiver has the complete vertical definition.

Instead of the combination DCT having a length of eight/inverse DCT having a length of six and vice versa,

it is also possible to use, for example, the combination DCT having a length of four/inverse DCT having a length of three and vice versa. It is then necessary to invert the signs of the coefficients in each case after three pixels in the vertical direction.

Instead of a DCT, it is also possible to use other steep-edged filters. Spectral values which go beyond 5/8 of the maximum frequency (f_{max}), for example, are clipped by a low-pass filter. Spectral values in the range of 6/8 to 7/8 f_{max} are separated by a bandpass filter and transmitted as an additional signal. Spectral values in the region of f_{max} are offset into the region of 6/8 f_{max} by means of suitable modulation. This procedure then takes place in the reverse order in the 16:9 decoder.

The method using the shifting of DCT coefficients can also be used to provide DCT coefficients for increasing the definition in the context of other picture format changes. If the number of lines is doubled, for example, the highest coefficient from the picture with the smaller number of lines can form the highest coefficient for the inverse DCT of twice the length for producing the high-definition signal and [sic] in this way to effect an increase in the vertical definition in the high-definition signal.

The method can also be used for de-interlacing (conversion of a field television signal into a frame television signal). Specifically, if a frame is formed from two respective fields having a dynamic picture content, the comb structures described in Fig. 6 can become evident in a disturbing manner. In order to avoid this, it suffices to calculate this disturbing content of the overall picture, which content is essentially represented simply by the highest vertical DCT coefficient, to invert it and add it to the existing overall picture content. The disturbing comb structure is advantageously eliminated as a result.

Patent Claims

1. Method for the transmission and for the compatible reception of standardized television signals with a first picture format, especially of 4:3, in which the essential picture content is arranged in a second picture format with a larger picture aspect ratio, especially of 16:9, within the first and with additional items of information (31,32), which are arranged in the region of the first picture format outside the essential picture content (30) and which can be decoded by a receiver for the second picture format, in order to present together with the information from the essential picture content a full format picture in the second picture format on this receiver, in which the transmitted television signals can be decoded by a standard receiver for the first picture format without evaluation of the additional items of information, characterized in that at the coder end:

- the television signal in the first picture format is generated from a source signal in the second picture format, in that vertical signal portions are formed from overlying pixels and the values of these pixels are each transformed into spectral components by means of a first one-dimensional type of transform;
- within these signal portions high-frequency spectral components (74) are shifted to the position (84) of less high-frequency spectral components and other, less high-frequency components are removed from the overall spectrum of the respective signal portion;
- the additional items of information are formed from these less high-frequency spectral components; from the spectral components (83) which are not shifted, together with the high-frequency spectral components, there are re-formed corresponding pixel values for the essential picture content by means of an inverse, second one-dimensional type of transform,

and in that when decoding for the second picture

format:

- these pixel values are transformed by means of the second type of transform into spectral components;
- these spectral components together with the respective associated high-frequency spectral components from the additional items of information are shifted back to the original coder-end arrangement in the signal portions;
- these overall spectral components are transformed into pixel values in each case by means of the inverse first type of transform,

and in that when decoding for the first picture format

- only the transmitted pixel values from the essential picture content are used.

2. Method according to Claim 1, characterized in that the first type of transform is a DCT with a first length and the second type of transform is a DCT with a second, smaller length, in particular the ratio of the two DCT lengths corresponding to the ratio of the two picture formats.

3. Method according to Claim 2, characterized in that instead of a DCT there are employed filters (low-pass, high-pass, bandpass filters) with limit frequencies corresponding to the respective spectral ranges.

4. Method according to one or more of Claims 1 to 3, characterized in that the signal portions in the first transform and in the inverse first transform in each case contain four or eight pixel values or transform coefficients.

5. Method according to Claim 4, characterized in that in each case in the signal portions either the high-frequency spectral components (74) consist of the eighth and the less high spectral components of the sixth and seventh transform coefficients or the high-frequency spectral components consist of the fourth and the less high spectral components of the third transform coefficient.

6. Method according to one or more of Claims 1 to 5,

characterized in that the additional items of information (31,32) are reduced before the transmission in their amplitude, especially according to a non-linear function, and during the decoding for the second picture format are increased in a correspondingly inverse way.

7. Coder for a method according to one or more of Claims 1 to 6 to which is supplied at the input of an analog-to-digital converter (41) a source signal in the second picture format and which is provided with a downstream first memory (42), with a downstream one-dimensional DCT transformer for the first type of transform (43), with a downstream sorter (44), which forwards the less high-frequency coefficients to a weighting circuit (46) with a non-linear function and the combined remaining coefficients to an inverse one-dimensional DCT transformer for the second type of transform (45), with a second memory (47) to which the output signals of the inverse DCT transformer and the weighting circuit are written accordingly and which is followed by a digital-to-analog converter (48), which supplies pictures in the first picture format as the output signal.

8. Decoder for a method according to one or more of Claims 1 to 6 to which is supplied at the input of an analog-to-digital converter (51) a source signal in the first picture format and which is provided with a downstream first memory (52), with a downstream one-dimensional DCT transformer for the second type of transform (53) and with a downstream weighting circuit (54) with a non-linear function that is inverse with respect to the coder-end weighting circuit (46), with a downstream sorter (55) which combines the less high-frequency coefficients from the weighting circuit and the remaining coefficients from the DCT transformer corresponding to the original coder-end arrangement and forwards them to an inverse one-dimensional DCT transformer for the first type of transform (56), with a downstream second memory (57) which is followed by a digital-to-analog converter (58) which supplies pictures in the second picture format as the output signal.

9. Method for the conversion of standardized television signals with fields into television signals with frames by the combination in each case of two mutually associated fields into a frame, characterized in that in the frames thereby resulting within vertical signal portions representing dynamic picture content and of a determined length, especially of eight pixel values, in each case there is calculated the highest-frequency coefficient (74) of a one-dimensional DCT of this length, this coefficient is subjected to an inverse DCT transform of this length, and the thereby resulting content of the signal portions is added inverted to the frames.



(As printed)

Claims

1. A method for the transmission and for the compatible reception of standardised television signals with a first picture format, especially of 4:3, in which the essential picture content is arranged in a second picture format with a larger picture-edge ratio, especially of 16:9, within the first and with additional items of information (31,32), which are arranged in the region of the first picture format outside the essential picture content (30) and which can be decoded by a receiver for the second picture format, in order to present together with the information from the essential picture content a full format picture in the second picture format on this receiver, in which the transmitted television pictures can be decoded by a standard receiver for the first picture format without evaluation of the additional items of information,
characterised in that at the coder end:
   - the television signal in the first picture format is generated from a source signal in the second picture format, in that vertical signal portions are formed from overlying picture points and the values of these picture points are each transformed into spectral components by means of a first one-dimensional type of transformation;
   - within these signal portions high frequency spectral components (74) are shifted to the position (84)

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of less high frequency spectral components and other, less high frequency components are removed from the overall spectrum of the respective signal portion;
- from the spectral components (83) which are not shifted together with the high frequency spectral components there are re-formed corresponding picture points for the essential picture content by means of an inverse one-dimensional type of transformation,
and in that when decoding for the second picture format:
- these picture point values are transformed by means of the second type of transformation into spectral components;
- these spectral components together with the respective associated high frequency spectral components from the additional items of information are shifted back to the original coder end arrangement in the signal portions;
- these overall spectral components are transformed into picture point values in each case by means of the inverse of the first type of transformation,
and in that when decoding for the first picture format
- only the transmitted picture point values from the essential picture content are used.

2. A method according to claim 1, characterised in that the first type of transformation is a DCT with a first length and the second type of transformation is a DCT with a second, smaller length, in particular the ratio of the two DCT-lengths corresponding to the ratio of the two picture formats.

3. A method according to claim 2, characterised in that instead of a DCT there are employed filters (low-pass, high-pass, band-pass filters) with limit frequencies corresponding to the respective spectral ranges.

4. A method according to one or more of claims 1 to 3, characterised in that the signal portions in the first transformation and in the inverse first transformation in each case contain four or eight picture point values or transformation coefficients.

5. A method according to claim 4, characterised in that in each case in the signal portions either the high frequency spectral components consist of the eighth and the less high spectral components from the sixth and seventh transformation coefficients or the high frequency spectral components consist of the fourth and the less high spectral components from the third transformation coefficients.

6. A method according to one or more of claims 1 to 5, characterised in that the additional items of information (31,32) are reduced before the transmission in their amplitude, especially according to a nonlinear function and during the decoding for the second picture format are increased in correspondingly inverse way.

7. A coder for a method according to one or more of claims 1 to 6 to which is supplied at the input of an analog-to-digital converter (41) a source signal in the second picture format and which is provided with a downstream first memory (42), with a downstream one-dimensional DCT transformer for the first type of transformation (43), with a downstream sorter (44), which feeds the less high frequency coefficients to a weighting circuit (46) with a non-linear function and the combined remaining coefficients to an inverse one-dimensional DCT transformer for the second type of transformation (45), with a second memory (47) into which the output signals of the inverse DCT transformer and the weighting circuit are written accordingly and which is followed by a digital-to-analog converter (48), which supplies pictures in the first picture format as the output signal.

8. A decoder circuit for a method according to one or more of claims 1 to 6 to which is supplied at the input of an analog-to-digital converter (51) a source signal in the first picture format and which is provided with a downstream first memory (52) with a downstream one-dimensional DCT transformer (53) and with a downstream weighting circuit (54) with a non-linear function that is inverse with respect to the coder end weighting circuit (46), with a downstream sorter (55) which combines the less high frequency components from the weighting circuit and the remaining coefficients from the DCT transformer corresponding to the original coder end arrangement and feeds them to an inverse one-dimensional DCT transformer for the first type of transformation (56) , with a downstream second memory (57) which is followed by a digital-to-analog converter (58) which supplies pictures in the second picture format as the output signal.

9. A method for the conversion of standardised television signals with fields into television signals with frames by the combination in each case of two mutually associated fields into a frame, characterised in that in the frames thereby resulting within vertical signal portions representing dynamic picture content

and of a determined length, especially of eight picture point values, in each case there is calculated the highest frequency coefficient (74) of a one-dimensional DCT of this length, this coefficient is subjected to an inverse DCT transformation of this length, and the thereby resulting content of the signal portions is added inverted to the frames.

(As printed)

Revendications

1. Procédé pour la transmission et la réception compatible de signaux télévisuels standardisés, comprenant un premier format d'image, notamment de 4:3, et dans lequel le contenu d'image essentiel dans un second format d'image avec un rapport largeur/hauteur plus élevé, notamment de 16/9e, est placé à l'intérieur du premier, et comprenant des informations complémentaires (31, 32), qui se trouvent dans le domaine du premier format et en dehors du contenu d'image essentiel (30), et qui sont décodables par un récepteur pour le second format, afin de représenter sur ce récepteur, dans le second format et en commun avec l'information du contenu d'image essentiel, une image remplissant le format, les signaux télévisuels transmis étant décodables par un récepteur standard pour le premier format, sans exploitation des informations complémentaires, **caractérisé en ce que** du côté du codeur:
   - on produit le signal télévisuel de premier format à partir d'un signal source de second format, en formant des portions verticales de signal à partir d'éléments d'image superposés et en transformant les échantillons de ces éléments d'image en portions spectrales, à chaque fois au moyen d'une première méthode de transformation à une dimension;
   - on décale, à l'intérieur de ces portions de signal, des portions spectrales RF (74) pour les mettre à la place (84) de portions spectrales moins radioélectriques et on enlève du spectre global de la portion de signal, d'autres portions spectrales moins radioélectriques;
   - on forme les informations complémentaires à partir de ces portions spectrales moins radioélectriques;
   - on reconstitue des échantillons équivalents d'éléments d'image à partir des portions spectrales non décalées (83) et des portions spectrales radioélectriques, au moyen d'une seconde méthode de transformation, inverse et à une dimension,

   et en ce que lors du décodage pour le second format:
   - on transforme ces échantillons d'éléments d'image en portions spectrales au moyen de la seconde méthode de transformation;
   - on décale ces portions spectrales avec les portions spectrales radioélectriques équivalentes des informations complémentaires pour les ramener à leur position d'origine du côté du codeur dans les portions de signal;
   - on transforme ces portions du spectre global en échantillons d'éléments d'image au moyen de l'inverse de la première méthode de transformation, et en ce que, lors du décodage pour le premier format:
   - on n'utilise que les échantillons transmis d'éléments d'image du contenu d'image essentiel.

2. Procédé selon la revendication 1, **caractérisé en ce que** la première méthode de transformation est une DCT d'une première longueur et que la seconde méthode de transformation est une DCT avec une seconde longueur, inférieure à la première, le rapport des deux longueurs DCT correspondant notamment au rapport des deux formats d'image.

3. Procédé selon la revendication 2, **caractérisé en ce qu'**on peut utiliser des filtres (filtre passe-bas, filtre passe-haut, filtre passe-bande) avec des fréquences d'arrêt correspondant aux domaines spectraux respectifs, en lieu et place d'une DCT.

4. Procédé selon l'une ou plusieurs des revendications 1 à 3 **caractérisé en ce que**, lors de la première transformation et de la première transformation inverse, les portions de signal contiennent quatre ou huit échantillons d'éléments d'image ou coefficients de transformation.

5. Procédé selon la revendication 4, **caractérisé en ce que**, dans les portions de signal, soit, les portions spectrales radioélectriques (74) se composent du huitième et les portions spectrales moins radioélectriques du sixième et du septième coefficients de transformation, soit, les portions spectrales radioélectriques se composent du quatrième et les portions spectrales moins radioélectriques du troisième coefficients de transformation.

6. Procédé selon l'une ou plusieurs des revendications 1 à 5, **caractérisé en ce qu'on** désaccentue les informations complémentaires (31, 32) dans leur amplitude avant la transmission, notamment selon une fonction non linéaire et qu'on les réaccentue, proportionellement et de manière inverse, lors du décodage pour le second format.

7. Codeur pour un procédé selon une ou plusieurs des revendications 1 à 6 recevant, à l'entrée d'un convertisseur analogique/numérique (41), un signal source dans le second format et pourvu d'une première mémoire (42) placée en aval, d'un transformateur DCT à une dimension pour la première méthode de transformation (43), placé en aval, d'un coordonnateur (44) placé en aval, amenant les coefficients moins radioélectriques à un circuit de pondération (46) avec une fonction non linéaire et les autres coeffficients, condensés, à un transformateur DCT inverse à une dimension pour la seconde méthode de transformation (45), d'une seconde mémoire (47), dans laquelle les signaux de sortie du transformateur DCT inverse et du circuit de pondération sont stockés de manière adéquate et à l'aval de laquelle on a placé un convertisseur numérique/analogique (48), qui fournit comme signal de sortie, des images dans le premier format.

8. Décodeur pour un procédé selon une ou plusieurs des revendications 1 à 6 recevant, à l'entrée d'un convertisseur analogique/numérique (51), un signal source dans le premier format et pourvu d'une première mémoire (52) placée en aval, d'un transformateur DCT à une dimension pour la seconde méthode de transformation (53), placé en aval, et d'un circuit de pondération (54) placé en aval, avec une fonction non linéaire inverse au circuit de pondération placé du côté du codeur (46), d'un coordonnateur (55) placé en aval, condensant, de manière équivalente au positionnement original du côté du codeur,et amenant à un transformateur DCT inverse et à une dimension pour la première méthode de transformation (56), les coefficients moins radioélectriques provenant du circuit de pondération et les coefficients venant du transformateur DCT, d'une seconde mémoire (57) placée en aval et suivie d'un convertisseur numérique/analogique (58), qui fournit comme signal de sortie, des images dans le second format.

9. Procédé de conversion de signaux télévisuels standardisés contenant des trames, en signaux télévisuels contenant des images pleines, au moyen de la réunion en une image pleine de deux trames équivalentes, **caractérisé en ce que**, dans les images pleines ainsi constituées, à l'intérieur de portions de signal verticales, représentant un contenu d'image dynamique et d'une longueur déterminée, notamment de huit échantillons d'éléments d'image, on calcule le coefficient le plus radioélectrique (74) d'une DCT à une dimension et de cette longueur et qu'on ajoute, de manière inverse, le contenu ainsi obtenu des portions de signal aux images pleines.