

CLAIMS

1. A method of video coding a block of a picture, comprising:
 obtaining a residual signal resulting from inter-picture prediction or intra-picture prediction;
 5 inferring use of a Discrete Cosine Transform type 2 (DCT2) transform core for a block of a
 sequence of the residual signal;
 processing the transformation of the block using the inferred transform core;

2. ~~The method according to claim 1~~, wherein use of DCT2 is inferred from a sequence level
 10 DCT2 enabled flag in a Sequence Parameter Set (SPS);

3. ~~The method according to claim 2~~, wherein the sequence level DCT2 enabled flag is
 denoted `sps_dct2_enabled_flag`.

4. ~~The method according to claim 2 or 3~~, wherein the sequence level DCT2 enabled flag is
 15 comprised in a SPS level syntax as follows:

<code>seq_parameter_set_rbsp() {</code>	Descriptor
<code>...</code>	<code>ue(v)</code>
<code>sps_dct2_enabled_flag</code>	
<code>if (! sps_dct2_enabled_flag) {</code>	
<code>sps_mts_intra_enabled_flag</code>	<code>u(1)</code>
<code>sps_mts_inter_enabled_flag</code>	<code>u(1)</code>
<code>}</code>	
<code>...</code>	<code>u(1)</code>
<code>}</code>	

wherein `sps_dct2_enabled_flag` represents the sequence level DCT2 enabled flag, wherein
 20 the `sps_mts_intra_enabled_flag` specifies whether a `tu_mts_flag` is present in the residual
 coding syntax for intra coding units or not, wherein the `sps_mts_inter_enabled_flag` specifies
 whether a `tu_mts_flag` is present in the residual coding syntax for inter coding units or not,
 wherein the `tu_mts_flag` is a multiple transform selection flag.

52. The method according to ~~any one of claims 2 to 4~~ claim 1,
 25 wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2
 transform core is used for transformation.

63. The method according to ~~any one of claims 2 to 5~~claim 1 or 2, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 transform core is used for transformation, only.

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74. The method according to any one of claims ~~2-1~~ to 63, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used for both horizontal direction transformation as well as vertical direction transformation.

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85. The method according to any one of claims ~~2-1~~ to 74, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used in sub block transformation.

96. The method according to claim 85, wherein in case one side of a residual Transform Unit, tu is greater than 32, a corresponding transform core is set as DCT2.

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~~107.~~ The method according to ~~any one of claims 2 to 9~~claim 5 or 6, wherein in case the sequence level DCT2 enabled flag is equal to 1 specifies that the DCT2 transform core is used for transformation, only, both the sub block transform as well as Multiple Transform Selection, MTS, transform are inferred as off.

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~~118.~~ The method according to any one of claim ~~2-1~~ to 85, wherein the sequence level DCT2 enabled flag being equal to 0 specifies that other transform cores than DCT2 are used for the transformation.

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~~129.~~ The method according to claim ~~118~~, wherein the other transform cores comprise a Discrete Sine Transform type 7 (DST7) and/or a Discrete Cosine Transform type 8 (DCT8).

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~~1310.~~ The method according to claim ~~11-8~~ or ~~129~~, wherein the sequence level DCT2 enabled flag being equal to 0 specifies that it is inferred using at least one of DST7 or DCT8 for transformation.

~~1411.~~ The method according to any one of claims ~~11-8~~ to ~~1310~~, wherein in case the sequence level DCT2 enabled flag being equal to 0, it is determined

whether Multiple Transform Selection for Sequence Parameter Set is enabled via a flag.

~~4512.~~ The method according to claim ~~4411~~,

wherein in case the `sps_mts_intra_enabled_flag` is present,

5 in case the `sps_mts_intra_enabled_flag` is equal to 1 it is specified that a Transform Unit (TU) Multiple Transform Selection (MTS) flag, denote `tu_mts_flag`, is present in the residual coding syntax for intra coding units;

 in case the `sps_mts_intra_enabled_flag` is equal to 0 it is specified that a `tu_mts_flag` is not present in the residual coding syntax for intra coding units;

10 wherein in case the `sps_mts_intra_enabled_flag` is not present, the `sps_mts_intra_enabled_flag` is inferred to be 0.

~~4613.~~ An encoder (20) comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~4512~~.

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~~4714.~~ A decoder (30) comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~4512~~.

~~4815.~~ An decoder (20) comprising:

20 an obtaining unit, configured to obtain a residual signal resulting from inter-picture prediction or intra-picture prediction;

 an inferring unit, configured to infer use of a Discrete Cosine Transform type 2 (DCT2) transform core for a block of a sequence of the residual signal; and

25 a processing unit, configured to process the transformation of the block using the inferred transform core;

~~19. The decoder according to claim 18, wherein the inferring unit is configured to infer use of DCT2 from a sequence level DCT2 enabled flag in a Sequence Parameter Set (SPS);~~

30 ~~20. The decoder according to claim 19, wherein the sequence level DCT2 enabled flag is denoted `sps_dct2_enabled_flag`.~~

~~21. The decoder according to claim 19 or 20, wherein the sequence level DCT2 enabled flag is comprised in a SPS level syntax as follows:~~

seq_parameter_set_rbsp() {	Descriptor
...	ue(v)
sps_dct2_enabled_flag	
if (! sps_dct2_enabled_flag) {	
sps_mts_intra_enabled_flag	u(1)
sps_mts_inter_enabled_flag	u(1)
}	
...	u(1)
}	

wherein sps_dct2_enabled_flag represents the sequence level DCT2 enabled flag, wherein the sps_mts_intra_enabled_flag specifies whether a tu_mts_flag is present in the residual coding syntax for intra coding units or not, wherein the sps_mts_inter_enabled_flag specifies whether a tu_mts_flag is present in the residual coding syntax for inter coding units or not, wherein the tu_mts_flag is a multiple transform selection flag.

2216. The decoder according to ~~any one of claims 19 to 21~~claim 15,

wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 transform core is used for transformation.

2317. The decoder according to ~~any one of claims 19 to 22~~claim 15 or 16,

wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 transform core is used for transformation, only.

2418. The decoder according to any one of claims ~~19-15~~ to 2317, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used for both horizontal as well as vertical direction transformation.

2519. The decoder according to any one of claims ~~19-15~~ to 2418, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used in sub block transformation.

2620. The decoder according to claim 2519, wherein in case one side of a residual Transform Unit (tu) is greater than 32, a corresponding transform is set as DCT2.

2721. The decoder according to ~~any one of claims 19 to 26~~claim 19 or 20, wherein in case

the sequence level DCT2 enabled flag is equal to 1 specifies that the DCT2 transform core is used for transformation, only, both the sub block transform as well as Multiple Transform Selection (MTS) transform are inferred as off.

5 ~~28~~22. The decoder according to any one of claims ~~19-15~~ to ~~25~~19,
 wherein the sequence level DCT2 enabled flag being equal to 0 specifies that other
transform cores than DCT2 are used for the transformation.

10 ~~29~~23. The decoder according to claim ~~28~~22,
 wherein the inferring unit is configured to infer using a Discrete Sine Transform type 7
(DST7) and/or a Discrete Cosine Transform type 8 (DCT8) for transformation.

15 ~~30~~24. The decoder according to claim ~~28-22~~ or ~~29~~23, wherein the sequence level DCT2
enabled flag being equal to 0
specifies that it is inferred using DST7/DCT8 for transformation, only.

20 ~~31~~25. The decoder according to any one of claims ~~28-22~~ to ~~30~~24,
 wherein in case the sequence level DCT2 enabled flag being equal to 0, it is determined
whether Multiple Transform Selection for Sequence Parameter Set is enabled via a flag.

25 ~~32~~26. The decoder according to claim ~~31~~25,
 wherein in case the sps_mts_intra_enabled_flag is present,
 in case the sps_mts_intra_enabled_flag is equal to 1 it is specified that a
Transform Unit (TU) Multiple Transform Selection (MTS) flag, denote tu_mts_flag,
is present in the residual coding syntax for intra coding units;
 in case the sps_mts_intra_enabled_flag is equal to 0 it is specified that a
tu_mts_flag is not present in the residual coding syntax for intra coding units;
 wherein in case the sps_mts_intra_enabled_flag is not present, the
sps_mts_intra_enabled_flag is inferred to be 0.

30 ~~33~~27. An encoder (20) comprising:
 an obtaining unit, configured to obtain a residual signal resulting from inter-picture
prediction or intra-picture prediction;
 an inferring unit, configured to infer use of a Discrete Cosine Transform type 2 (DCT2)

transform core for a block of a sequence of the residual signal; and

a processing unit, configured to process the transformation of the block using the inferred transform core;

5 ~~34. The encoder according to claim 33, wherein the inferring unit is configured to infer use of DCT2 from a sequence level DCT2 enabled flag in a Sequence Parameter Set (SPS);~~

~~35. The encoder according to claim 34, wherein the sequence level DCT2 enabled flag is denoted sps_dct2_enabled_flag.~~

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~~36. The encoder according to claim 34 or 35, wherein the sequence level DCT2 enabled flag is comprised in a SPS level syntax as follows:~~

seq_parameter_set_rbsp() {	Descriptor
...	ue(v)
sps_dct2_enabled_flag	
if (! sps_dct2_enabled_flag) {	
sps_mts_intra_enabled_flag	u(1)
sps_mts_inter_enabled_flag	u(1)
}	
...	u(1)
}	

15 wherein sps_dct2_enabled_flag represents the sequence level DCT2 enabled flag, wherein the sps_mts_intra_enabled_flag specifies whether a tu_mts_flag is present in the residual coding syntax for intra coding units or not, wherein the sps_mts_inter_enabled_flag specifies whether a tu_mts_flag is present in the residual coding syntax for inter coding units or not, wherein the tu_mts_flag is a multiple transform selection flag.

20 ~~3728. The encoder according to any one of claims 34 to 36~~ claim 27,

wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 transform core is used for transformation.

~~3829. The encoder according to any one of claims 34 to 37~~ claim 27 or 28,

25 wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 transform core is used for transformation, only.

3930. The encoder according to any one of claims 34-27 to 3829, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used for both horizontal as well as vertical directions in shape adaptive transform selection.

5 4031. The encoder according to any one of claims 34-27 to 3930, wherein the sequence level DCT2 enabled flag being equal to 1 specifies that DCT2 is used in sub block transformation.

4132. The encoder according to claim 4031, wherein in case one side of a residual
10 Transform Unit, tu is greater than 32, a corresponding transform is set as DCT2.

4233. The encoder according to ~~any one of claims 34 to 41~~ claim 31 or 32, wherein in case the sequence level DCT2 enabled flag is equal to 1 specifies that the DCT2 transform core is used for transformation, only, both the sub block transform as well as Multiple Transform
15 Selection (MTS) transform are inferred as off.

4334. The encoder according to any one of claims 34-27 to 4031,
wherein the sequence level DCT2 enabled flag being equal to 0 specifies that other
transform cores than DCT2 are used for the transformation.

20 4435. The encoder according to claim 4334,
wherein the inferring unit is configured to infer using a Discrete Sine Transform type 7 (DST7) and/or a Discrete Cosine Transform type 8 (DCT8) for transformation.

25 4536. The encoder according to claim 43-34 or 4435, wherein the sequence level DCT2 enabled flag being equal to 0
specifies that it is inferred using DST7/DCT8 for transformation, only.

4637. The encoder according to any one of claims 43-34 to 4536,
30 wherein in case the sequence level DCT2 enabled flag being equal to 0, it is determined whether Multiple Transform Selection for Sequence Parameter Set is enabled via a flag.

4738. The encoder according to claim 4637,
wherein in case the sps_mts_intra_enabled_flag is present,

in case the `sps_mts_intra_enabled_flag` is equal to 1 it is specified that a Transform Unit, TU, Multiple Transform Selection, MTS flag, denote `tu_mts_flag`, is present in the residual coding syntax for intra coding units;

5 in case the `sps_mts_intra_enabled_flag` is equal to 0 it is specified that a
 `tu_mts_flag` is not present in the residual coding syntax for intra coding units;
 wherein in case the `sps_mts_intra_enabled_flag` is not present, the
 `sps_mts_intra_enabled_flag` is inferred to be 0.

4839. A decoder, comprising:
10 one or more processors; and
 a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by the processors, configures the decoder to carry out the method according to any one of claims 1 to 4512.

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4940. An encoder, comprising:
 one or more processors; and
 a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by
20 the processors, configures the encoder to carry out the method according to any one of claims 1 to 4512.

5041. A computer-readable non-transitory medium storing a program, including instructions which when executed on a processor cause the processor to perform the method according to
25 any of claims 1 to 4512.

5142. A non-transitory storage medium comprising a bitstream encoded by the encoder of claim 4941.