

CLAIMS

What is claimed is:

1. A method for video processing, comprising:
determining, for a conversion between a current video block of a video that is a chroma
5 block and a coded representation of the video, parameters of a cross-component linear model
(CCLM) based on two or four chroma samples and/or corresponding luma samples; and
performing the conversion based on the determining.
2. The method of claim 1, wherein the corresponding luma samples are obtained by down-
10 sampling.
3. The method of claim 1, wherein a maxY, a maxC, a minY, and a minC are derived firstly
and are used to derive the parameters.
- 15 4. The method of claim 3, wherein the parameters are derived based on 2-point approach.
5. The method of claim 3, wherein the two chroma samples are selected to derive the
maxY, the maxC, the minY and the minC, and wherein the minY is set to be the smaller luma
sample value, the minC is its corresponding chroma sample value, the maxY is set to be the
20 larger luma sample value, and the maxC is its corresponding chroma sample value.
6. The method of claim 3, wherein the four chroma samples are selected to derive the
maxY, the maxC, the minY and the minC, and wherein the four chroma samples and the
corresponding luma samples are divided into two arrays G0 and G1, each array including two
25 chroma samples and their corresponding luma samples.
7. The method of claim 6, wherein the two arrays G0 and G1 include one of following sets:
i) $G0=\{S0, S1\}$, $G1=\{S2, S3\}$,
ii) $G0=\{S1, S0\}$, $G1=\{S3, S2\}$,

- iii) $G0=\{S0, S2\}$, $G1=\{S1, S3\}$,
 iv) $G0=\{S2, S0\}$, $G1=\{S3, S1\}$,
 v) $G0=\{S1, S2\}$, $G1=\{S0, S3\}$,
 vi) $G0=\{S2, S1\}$, $G1=\{S3, S0\}$,
 5 vii) $G0=\{S0, S3\}$, $G1=\{S1, S2\}$,
 viii) $G0=\{S3, S0\}$, $G1=\{S2, S1\}$,
 ix) $G0=\{S1, S3\}$, $G1=\{S0, S2\}$,
 x) $G0=\{S3, S1\}$, $G1=\{S2, S0\}$,
 xi) $G0=\{S3, S2\}$, $G1=\{S0, S1\}$, or
 10 xii) $G0=\{S2, S3\}$, $G1=\{S1, S0\}$, and
 wherein S0, S1, S2, S3 include the four chroma samples, respectively, and further includes corresponding luma samples, respectively.

8. The method of claim 7, wherein upon a comparison of two luma sample values of $G0[0]$ and $G0[1]$, a chroma sample and its corresponding luma sample of $G0[0]$ are swapped with those of $G0[1]$.

9. The method of claim 8, wherein the chroma sample and its corresponding luma sample of $G0[0]$ are swapped with those of $G0[1]$ in a case that a luma sample value of $G0[0]$ is greater than a luma sample value of $G0[1]$.

10. The method of claim 7, wherein upon a comparison of two luma sample values of $G1[0]$ and $G1[1]$, a chroma sample and its corresponding luma sample of $G1[0]$ are swapped with those of $G1[1]$.

11. The method of claim 10, wherein the chroma sample and its corresponding luma sample of $G1[0]$ are swapped with those of $G1[1]$ in a case that a luma sample value of $G1[0]$ is greater than a luma sample value of $G1[1]$.

12. The method of claim 6, wherein upon a comparison of two luma sample values of G0[0] and G1[1], chroma samples and its corresponding luma samples of G0 are swamped with those of G1.
- 5 13. The method of claim 12, wherein the chroma samples and its corresponding luma samples of G0 are swamped with those of G1 in a case that a luma sample value of G0[0] is greater than a luma sample value of G1[1].
- 10 14. The method of claim 7, wherein upon a comparison of two luma sample values of G0[1] and G1[0], a chroma sample and its corresponding luma sample of G0[1] are swamped with those of G1[0].
- 15 15. The method of claim 14, wherein the chroma sample and its corresponding luma sample of G0[1] are swamped with those of G1[0] in a case that a luma sample value of G0[1] is greater than a luma sample value of G1[0].
- 20 16. The method of claim 7, wherein upon a comparison of two luma sample values of G0[0], G0[1], G1[0], and G1[1], following swamping operations are selectively conducted in an order: i) a swamping operation of a chroma sample and its corresponding luma sample of G0[0] with those of G0[1], ii) a swamping operation of a chroma sample and its corresponding luma sample of G1[0] with those of G1[1], iii) a swamping operation of chroma samples and its corresponding luma samples of G0 with those of G1, and iv) a swamping operation of a chroma sample and its corresponding luma sample of G0[1] with those of G1[0].
- 25 17. The method of claim 7 or 16, wherein maxY is calculated based on a sum of luma sample values of G1[0] and G1[1], and maxC is calculated based on a sum of chroma sample values of G1[0] and G1[1].
- 30 18. The method of claim 7 or 16, wherein maxY is calculated based on an average of luma sample values of G1[0] and G1[1], and maxC is calculated based on an average of chroma sample values of G1[0] and G1[1].

19. The method of claim 7 or 16, wherein minY is calculated based on a sum of luma sample values of G0[0] and G0[1], and minC is calculated based on a sum of chroma sample values of G0[0] and G0[1].
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20. The method of claim 7 or 16, wherein minY is calculated based on an average of luma sample values of G0[0] and G0[1], and minC is calculated based on an average of chroma sample values of G0[0] and G0[1].
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21. The method of any of claims 17 to 20, wherein the calculations of maxY and maxC or the calculations of minY and minC are conducted after any one of swamping operations that are performed upon a comparison of two luma sample values of G0[0], G0[1], G1[0] and G1[1], wherein the swamping operations include: i) a swamping operation of a chroma sample and its corresponding luma sample of G1[0] with those of G1[1], ii) a swamping operation of chroma samples and corresponding luma samples of G0 with those of G1, iii) a swamping operation of a chroma sample and its corresponding luma sample of G0[1] with those of G1[0], or iv) a swamping operation of chroma samples and corresponding luma samples of G0[0] with those of G0[1].
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22. The method of claim 1, wherein in a case that there are only two chroma samples are available, a padding is performed on the two available chroma samples to provide the four chroma samples, and also performed on the two corresponding available luma samples to provide the four luma samples.
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23. The method of claim 22, wherein the four chroma samples include the two available chroma samples and two padding chroma samples that are copied from the two available chroma samples, and the four corresponding luma samples include the two available luma samples and two padding luma samples that are copied from the two available luma samples.
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24. The method of claim 7, wherein S0, S1, S2, S3 are chroma samples and corresponding luma samples are selected in a given order within an above row and/or a left column of the current video block.
- 5 25. A method for video processing, comprising:
selecting, for a conversion between a current video block of a video that is a chroma block and a coded representation of the video, chroma samples based on a position rule, the chroma samples used to derive parameters of a cross-component linear model (CCLM); and
performing the conversion based on the determining,
10 wherein the position rule specifies to select the chroma samples that are located within an above row and/or a left column of the current video block.
26. The method of claim 25, wherein the above row and the left column have W samples and H samples, respectively, W and H being a width and a height of the current video block,
15 respectively.
27. The method of claim 26, wherein the position rule is applied for the current video block coded with a normal CCLM mode that is different from a first CCLM mode that uses only above-neighboring samples to derive the parameters of the cross-component linear model and
20 from a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.
28. The method of claim 26, wherein the position rule specifies to select the chroma samples that are located within the above row and an above-right row of the current video block.
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29. The method of claim 28, wherein the above row and the above-right row have W samples and H samples, respectively, W and H being a width and a height of the current video block, respectively.

30. The method of claim 28, wherein only available samples within the above row and the above-right row are selected.

31. The method of claim 28, wherein the position rule is applied for the current video block
5 coded with a first CCLM mode that uses only above-neighboring samples to derive the parameters of the cross-component linear model.

32. The method of claim 28, wherein the position rule is applied to a case that the above-row is available and the left column is unavailable and that the current video block is coded with a
10 normal CCLM mode that is different from a first CCLM mode that uses only above-neighboring samples to derive the parameters of the CCLM and from a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.

33. The method of any of claims 26-32, wherein numSampT is set based on a rule specifying
15 that numSampT is set equal to nTbW in a case that above neighboring samples are available and numSampT is set equal to 0 in a case that the above neighboring samples are not available, and wherein numSampT represents the number of chroma samples within an above neighboring row used to derive the parameters of the cross-component linear model and nTbW represents an width of the current video block.

20 34. The method of claim 33, wherein the rule is applied for the current video block coded with a normal CCLM mode that is different from a first CCLM mode that uses only above-neighboring samples to derive the CCLM and from a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.

25 35. The method of any of claims 26-32, wherein numSampT is set based on a rule specifying that numSampT is set equal to $nTbW + \text{Min}(\text{numTopRight}, nTbH)$ in a case that above neighboring samples are available and the current video block is coded with a first CCLM mode that uses only above-neighboring samples to derive the parameters of the cross-component linear
30 model, and that otherwise the numSampT is set equal to 0, and wherein numSampT represents the number of chroma samples within an above neighboring row used to derive the parameters of

the cross-component linear model, $nTbW$ and $nTbH$ represent a width and a height of the current block, respectively, and $numTopRight$ represents the number of available top right neighboring samples.

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36. The method of claim 25, wherein the position rule specifies to select the chroma samples that are located within the left column and a below-left column of the current video block.

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37. The method of claim 36, wherein the left column and the below-left column have H samples and W samples, respectively, W and H being a width and a height of the current video block, respectively.

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38. The method of claim 36, wherein only available samples within the left column and the below-left column are selected.

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39. The method of claim 36, wherein the position rule is applied for the current video block coded with a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.

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40. The method of claim 36, wherein the position rule is applied to a case that the above-row is unavailable and the left-column is available and that the current video block is coded with a normal CCLM mode that is different from a first CCLM mode that uses only above-neighboring samples to derive the parameters of the CCLM and from a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.

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41. The method of any of claims 36-40, wherein $numSampL$ is set based on a rule specifying that $numSampL$ is set equal to $nTbH$ in a case that left neighboring samples are available and otherwise $numSampL$ is set equal to 0, and wherein $numSampL$ represents the number of chroma samples within a left neighboring column used to derive the parameters of the cross-component linear model and $nTbH$ represents a height of the current video block.

42. The method of claim 41, wherein the rule is applied for the current video block coded with a normal CCLM mode that is different from a first CCLM mode that uses only above-neighboring samples to derive the parameters of the cross-component linear model and from a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model.

43. The method of any of claims 36-40, wherein numSampL is set based on a rule specifying that numSampL is set equal to $nTbH + \text{Min}(\text{numLeftBelow}, nTbW)$ in a case that left neighboring samples are available and the current video block is coded with a second CCLM mode that uses only left-neighboring samples to derive the parameters of the cross-component linear model and that otherwise numSampL is set equal to 0, and wherein numSampL represents the number of chroma samples within a left neighboring column used to derive the parameters of the cross-component linear model, nTbW and nTbH represent a width and a height of the current block, respectively, and numLeftBelow represents the number of available below-left neighboring samples.

44. The method of any of claims 25-43, wherein luma samples corresponding to selected chroma samples are used to derive the parameters of the cross-component linear model.

45. The method of claim 44, wherein the luma samples are derived by downsampling.

46. The method of any of claims 1-45, wherein the performing of the conversion includes generating the coded representation from the current block.

47. The method of any of claims 1-45, wherein the performing of the conversion includes generating the current block from the coded representation.

48. The method of any of claims 1-47, wherein the CCLM used down-sampled collocated luma component samples to derive prediction values of chroma component samples of the current block based on a linear model including the parameters of the cross-component linear model.

49. An apparatus in a video system comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to implement the method recited in one or more of claims 1 to 48.

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50. A computer program product stored on a non-transitory computer readable media, the computer program product including program code for carrying out the method recited in one or more of claims 1 to 48.