HIGH LEVEL BITSTREAM SYNTAX FOR QUANTIZATION PARAMETERS

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on International Patent Application No. PCT/CN2021/080183, filed on March 11, 2021, which claims the priority to and benefits of International Patent Application No. PCT/CN2020/078770, filed on March 11, 2020. All the aforementioned patent applications are hereby incorporated by reference in their entireties.~~Under the applicable patent law and/or rules pursuant to the Paris Convention, this application is made to timely claim the priority to and benefits of International Patent Application No. PCT/CN2020/078770, filed on March 11, 2020. For all purposes under the law, the entire disclosure of the aforementioned application is incorporated by reference as part of the disclosure of this application.~~

TECHNICAL FIELD

[002] This patent document relates to image and video coding and decoding.

BACKGROUND

[003] Digital video accounts for the largest bandwidth use on the internet and other digital communication networks. As the number of connected user devices capable of receiving and displaying video increases, it is expected that the bandwidth demand for digital video usage will continue to grow.

SUMMARY

[004] The present document discloses techniques that can be used by video encoders and decoders for processing coded representation of video using control information useful for decoding of the coded representation.

[005] In one example aspect, a video processing method is disclosed. The method includes performing a conversion between a video comprising a video unit and a bitstream of the video according to a rule, wherein the rule specifies whether or how to include, in an adaptation parameter set (APS), information related to a scaling list of the video is based on a first syntax element that indicates whether the APS includes chroma component related syntax elements and is independent of one or more syntax elements in a sequence parameter set (SPS).

[006] In another example aspect, a video processing method is disclosed. The method includes performing a conversion between a video and a bitstream of the video according to a rule, wherein the rule specifies that a syntax element is included in an adaptation parameter set (APS), and

CLAIMS

1. A method of video processing, comprising:

performing a conversion between a video comprising a luma block and a bitstream of the video according to a rule,

wherein the rule specifies that whether a slice header (SH) includes a first syntax element is based on a second syntax element, and

wherein the first syntax element indicates whether use of a delta quantization parameter (QP) is enabled for one or more coding units (CUs) of a specific slice of the luma block.

2. The method of claim 1, wherein the rule specifies that whether the first syntax element is included in the SH is based on the second syntax element included in a picture parameter set (PPS) that indicates whether use of the delta QP is enabled for one or more video pictures of the video.

3. The method of claim 2,

wherein the rule specifies that the first syntax element is not included in the SH and is inferred to have a first value of 0 when a second value of the second syntax element is 0, and

wherein the rule specifies that the first syntax element is included in the SH when the second value of the second syntax element is 1.

4. The method of claim 2, wherein the rule specifies that a first value of the first syntax element is based on a second value of the second syntax element.

5. The method of claim 1,

wherein the rule specifies that the second syntax element included in a picture parameter set (PPS) that indicates whether use of the delta QP is enabled for one or more video pictures of the video, and

wherein the rule specifies that the second syntax element controls:

(1) whether the first syntax element is included in the SH, and/or

1. A method of processing video data, comprising:

performing a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

2. The method of claim 1, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax.

3. The method of claim 2,

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax, and

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the

(2) whether a transform unit syntax and a palette coding syntax include a third syntax element that indicates an absolute value of a difference between a QP value of a current CU and a prediction value of the CU and/or a fourth syntax element that indicates a sign of the difference between the QP value of the current CU and the prediction value of the CU.

6. The method of claim 1, wherein the rule specifies that a picture parameter set (PPS) includes:

an identifier for the PPS coded with ue(v),

an initial value coded with se(v) indicating a luma QP for each slice referring to the PPS, and

the second syntax element coded with u(1) indicating (1) whether ph_cu_qp_delta_subdiv_intra_slice syntax element and ph_cu_qp_delta_subdiv_inter_slice syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether a third syntax element that indicates an absolute value of a difference between a QP value of a current CU and a prediction value of the CU is present in a transform unit syntax and a palette coding syntax, and

a fourth syntax element coded with u(1) indicating whether chroma tool offsets related syntax elements are included in the PPS.

7. The method of claim 6,

wherein the rule specifies that when a value of the second syntax element is 1, the ph_cu_qp_delta_subdiv_intra_slice syntax element and the ph_cu_qp_delta_subdiv_inter_slice syntax element are present in the one or more PHs referring to the PPS and the third synax element is present in the transform unit syntax and the palette coding syntax, and

wherein the rule specifies that when a value of the second syntax element is 0, the ph_cu_qp_delta_subdiv_intra_slice syntax element and the ph_cu_qp_delta_subdiv_inter_slice syntax element are not present in the one or more PHs referring to the PPS and the third syntax element is not present in the transform unit syntax and the palette coding syntax.

8. The method of claim 6, wherein a PH from the one or more PHs includes the following structure:

PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax.

4. The method of claim 2 or 3, wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

5. The method of any of claims 1-4, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS.

6. The method of any of claims 1-5, wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to:

picture_header_structure( ) {	Descriptor
gdr_or_irap_pic_flag	u(1)
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

9. The method of claim 6, wherein the rule specifies that the SH includes a fifth syntax element that indicates whether the third syntax element is present in the transform unit syntax and the palette coding syntax when the second syntax element in the PPS indicates that (1) the ph_cu_qp_delta_subdiv_intra_slice syntax element and the ph_cu_qp_delta_subdiv_inter_slice syntax element are present in the one or more PHs referring to the PPS, and that (2) the third syntax element is present in the transform unit syntax and the palette coding syntax.

10. The method of claim 9, wherein the rule specifies that when a value of the fifth syntax element is 1, the third syntax element is present in the transform unit syntax and the palette coding syntax, and

wherein the rule specifies that when the value of the fifth syntax element is 0, the third syntax element is not present in the transform unit syntax and the palette coding syntax.

11. The method of claim 1, wherein the rule specifies that the first syntax element controls whether a third syntax element that indicates an absolute value of a difference between a QP

a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and

a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples.

7. The method of claim 6, wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS, and

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements.

8. The method of any of claims 1-7,

wherein the rule specifies that a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and

a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

9. The method of any of claims 1-8, wherein the performing the conversion comprises encoding the video into the bitstream.

value of a current CU and a prediction value of the CU is present in a transform unit syntax and a palette coding syntax.

12. The method of claim 11,

wherein the rule specifies that when a first value of the first syntax value is 1, the third syntax element is included in the transform unit syntax and the palette coding syntax, and

wherein the rule specifies that when the first value of the first syntax value is 0, the third syntax element is not included in the transform unit syntax and the palette coding syntax.

13. The method of claim 1,

wherein the rule specifies that a cu_qp_offset syntax element for a chroma block of the video is not controlled by the first syntax element of the SH, and

wherein the rule specifies that the cu_qp_offset syntax element for the chroma block is based on a flag indicated in a picture header (PH), a picture parameter set (PPS), or a sequence parameter set (SPS).

14. The method of claim 1, wherein the rule further specifies that a picture header (PH) includes a flag that controls whether use of the delta QP is enabled for the one or more CUs of the specific slice of the luma block.

15. A method of video processing, comprising:

performing a conversion between a video comprising video pictures and a bitstream of the video according to a rule,

wherein the rule specifies that responsive to a first syntax element indicating that each subpicture of a video picture includes only one rectangular slice:

a second syntax element plus 1 indicating a number of rectangular slices in each video picture referring to a picture parameter set (PPS) is equal to a third syntax element plus 1 indicating a number of subpictures in each video picture in a coded layer video sequence (CLVS) of the bitstream.

10. The method of any of claims 1-8, wherein the performing the conversion comprises decoding the video from the bitstream.

11. An apparatus for processing video data comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to:

perform a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

12. The apparatus of claim 11, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring

~~16. The method of claim 15, wherein the rule specifies that a first video picture and the second video picture of the video refer to different picture parameter sets (PPSs) when:~~

~~(1) a value of the third syntax element is equal to 0,~~

~~(2) a fourth syntax element indicates that a rectangular slice mode is in use for each video picture referring to the PPS and that a slice layout is included in the PPS,~~

~~(3) the first video picture includes only one slice, and~~

~~(4) a second video picture includes a plurality of slices.~~

~~17. The method of claim 15,~~

~~wherein the rule specifies that each of subpicture of a video picture includes one or more rectangular slices and each of a plurality of subpictures of the video picture does not include only one rectangular slice when a value of the third syntax element is greater than 0, and~~

~~wherein the rule specifies that each video picture comprises a plurality of slices when the value of the third syntax element is equal to 0.~~

~~18. The method of claim 15, wherein the rule specifies that a first value of the first syntax element is equal to 1 when a second value of the third syntax element is equal to 0 and when each video picture referring to the PPS includes only one slice.~~

~~19. The method of claim 15, wherein the rule specifies that a first value of the first syntax element is equal to 1 when a second value of the third syntax element is greater than 0 and when each video picture referring to the PPS includes only one slice.~~

~~20. The method of claim 15, wherein the rule specifies that a first value of the first syntax element is equal to 1 when each subpicture of a video picture includes only one rectangular slice.~~

~~21. The method of claim 15, wherein the rule specifies that a presence of a tile_idx_delta_present_flag syntax element in the PPS is not based on the second syntax element.~~

~~22. The method of claim 15, wherein the rule specifies that a presence of a tile_idx_delta_present_flag syntax element in the PPS is based on a fourth syntax element,~~

to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

13. The apparatus of claim 11 or 12, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS.

14. The apparatus of any of claims 11-13, wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum

wherein the fourth syntax element plus 2 indicates the number of rectangular slices in each video picture referring to the PPS.

23. The method of claim 22, wherein the rule specifies that a number of slices in a video picture is equal to the fourth syntax element plus 2.

24. The method of claim 22, wherein the rule specifies that a number of slices in a video picture is equal to 1 when a flag indicates that no picture partitioning is applied to each video picture referring to the PPS.

25. The method of claim 22, wherein the rule specifies that a number of slices in a video picture is equal to the second syntax element minus 1 when the first syntax element has a value of 1.

26. A method of video processing, comprising:

performing a conversion between a video comprising video pictures and a bitstream of the video according to a rule,

wherein the rule specifies that a picture parameter set (PPS) includes one or more syntax element that indicates whether a video picture of the video is divided into tile rows or columns with a first number of tile rows or columns having a same height and a second number of tile rows or columns having different heights or widths, and

wherein the first number of tile rows or columns are located in the video picture before the second number of tile rows or columns.

27. The method of claim 26,

wherein the rule specifies that when:

(1) a flag in the PPS indicates that no picture partitioning is applied to each video picture referring to the PPS, and

(2) a first syntax element in the PPS indicates that a number of explicitly provided tile column widths minus 1 is greater than 1,

width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

15. A non-transitory computer-readable storage medium storing instructions that cause a processor to:

perform a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

the PPS includes a second syntax element that indicates whether the video picture is divided into more than two tile columns with a first number of tile columns of a same width and a second number of tile columns having different widths, and

wherein the first number of tile columns are located in the video picture before the second number of tile columns.

28. The method of claim 26,

wherein the rule specifies that when

(1) a flag in the PPS indicates that no picture partitioning is applied to each video picture referring to the PPS, and

(2) a third syntax element in the PPS indicates that a number of explicitly provided tile rows heights minus 1 is greater than 1,

Wherein the PPS includes a fourth syntax element that indicates whether the video picture is divided into more than two tile rows with a first number of tile rows of a same height and a second number of tile rows having different heights, and

wherein the first number of tile rows are located in the video picture before the second number of tile rows.

29. The method of any of claims 27 and 28, wherein the rule specifies that the tile column widths and/or the tile row heights are derived based on the second syntax element and the fourth syntax element, respectively.

30. The method of claim 26,

wherein the rule specifies that when a tile of the video picture is divided by multiple slices, the one or more syntax element in the PPS includes a first syntax element that indicates whether a tile is derived into multiple slice rows,

wherein a first number of slice rows have a same height and a second number of slice rows have different heights, and

wherein the first number of slice rows are located in the tile before the second number of slice rows.

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

16. The non-transitory computer-readable storage medium of claim 15, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	

31. The method of claim 30,

wherein the rule specifies that slice heights of the multiple slices are derived based on a value of a second syntax element in the PPS,

wherein the second syntax element indicates whether the video picture is divided into more than two tile rows with a first number of tile rows of a same height and a second number of tile rows having different heights, and

wherein the first number of tile rows are located in the video picture before the second number of tile rows.

32. The method of any of claims 1 to 31, wherein the performing the conversion comprising encoding the video into the bitstream.

33. The method of any of claims 1 to 31, wherein the performing the conversion comprises generating the bitstream based on the video, and the method further comprises storing the bitstream in a non-transitory computer-readable recording medium.

34. The method of any of claims 1 to 31, wherein the performing the conversion comprises decoding the video from the bitstream.

35. A video decoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 34.

36. A video encoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 34.

37. A computer program product having computer instructions stored thereon, the instructions, when executed by a processor, causes the processor to implement a method recited in any of claims 1 to 34.

38. A non-transitory computer-readable storage medium that stores a bitstream generated according to the method in any one of claims 1 to 34.

ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

17. The non-transitory computer-readable storage medium of claim 15 or 16, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS;

wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in the SPS in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS,

~~39. A non-transitory computer-readable storage medium storing instructions that cause a processor to implement a method recited in any of claims 1 to 34.~~

~~40. A method of bitstream generation, comprising:~~

~~generating a bitstream of a video according to a method recited in any of claims 1 to 34, and~~

~~storing the bitstream on a computer-readable program medium.~~

~~41. A method, an apparatus, a bitstream generated according to a disclosed method or a system described in the present document.~~

wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

18. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating the bitstream of the video which comprises blocks according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

19. The non-transitory computer-readable recording medium of claim 18, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third

syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

20. The non-transitory computer-readable recording medium of claim 18 or 19, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that

each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS;

wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in the SPS in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.