

WHAT IS CLAIMED IS:

1. A method of decoding a picture of video data, the method comprising:
 - determining a picture quantization parameter (QP) value of the picture of video data;
 - determining an intermediate chroma QP offset value for a chroma QP value using the picture QP value and a first function based on video characteristics of the picture of video data;
 - determining the chroma QP value with a second function of the intermediate chroma QP offset value; and
 - decoding the picture of video data using the chroma QP value to produce a decoded picture.
2. The method of claim 1, wherein the first function is implemented as a lookup table from a plurality of lookup tables, wherein the picture QP value is an input to the lookup table, and wherein the lookup table is based on video characteristics of the picture of video data.
3. The method of claim 2, wherein the video characteristics of the picture of video data includes one or more of a color component, a color gamut, or a color space.
4. The method of claim 2, further comprising:
 - determining the picture QP value based on a base QP value and a hierarchical QP offset value,
 - wherein determining the intermediate chroma QP offset value for the chroma QP value comprises determining the intermediate chroma QP offset value for the chroma QP value based on the picture QP value and the lookup table.
5. The method of claim 4, wherein determining the chroma QP value as the second function of the intermediate chroma QP offset value comprises:
 - determining the chroma QP value based on the picture QP value, the intermediate chroma QP offset value, and a fixed chroma QP offset value.

6. The method of claim 4, wherein determining the intermediate chroma QP offset value comprises:

determining a first intermediate chroma QP offset value for the chroma QP value based on the base QP value and the lookup table; and

determining a second intermediate chroma QP offset value for the chroma QP value based on the picture QP value and the lookup table.

7. The method of claim 6, wherein determining the chroma QP value as the second function of the intermediate chroma QP offset value comprises:

determining the chroma QP value based on the picture QP value, the first intermediate chroma QP offset value, the second intermediate chroma QP offset value, and a fixed chroma QP offset value

8. The method of claim 2, further comprising:

determining the lookup table from the plurality of lookup tables based on one or more of a chroma color component or a color gamut of the picture.

9. The method of claim 2, further comprising:

determining the lookup table from the plurality of lookup tables based on a syntax element received in an encoded video bitstream.

10. The method of claim 1, further comprising:

determining a luma scale value for dynamic range adjustment;

determining a chroma scale value for dynamic range adjustment as a third function a base QP value, a fixed chroma QP offset value, the luma scale value, and a linearized version of the intermediate chroma QP offset value; and

performing a dynamic range adjustment on the decoded picture using the luma scale value and the chroma scale value.

11. The method of claim 1, further comprising:
 - determining a luma scale value for dynamic range adjustment;
 - determining a chroma scale value for dynamic range adjustment as a third function a base QP value, a fixed chroma QP offset value, the luma scale value, a color gamut of the picture, and a linearized version of the intermediate chroma QP offset value; and
 - performing a dynamic range adjustment on the decoded picture using the luma scale value and the chroma scale value.
12. The method of claim 1, wherein determining the intermediate chroma QP offset value comprises determining the intermediate chroma QP offset value for the chroma QP value based on a base QP value, and one or more of a QP value from a picture parameter set, and a QP value from a slice header.
13. The method of claim 1, further comprising:
 - outputting the decoded picture for display.
14. An apparatus configured to decode video data, the apparatus comprising:
 - a memory configured to store a picture of video data; and
 - one or more processors in communication with the memory, the one or more processors configured to:
 - determine a picture quantization parameter (QP) value of the picture of video data;
 - determine an intermediate chroma QP offset value for a chroma QP value using the picture QP value and a first function based on video characteristics of the picture of video data;
 - determine the chroma QP value with a second function of the intermediate chroma QP offset value; and
 - decode the picture of video data using the chroma QP value to produce a decoded picture.

15. The apparatus of claim 14, wherein the first function is implemented as a lookup table from a plurality of lookup tables, wherein the picture QP value is an input to the lookup table, and wherein the lookup table is based on video characteristics of the picture of video data.

16. The apparatus of claim 15, wherein the video characteristics of the picture of video data includes one or more of a color component, a color gamut, or a color space.

17. The apparatus of claim 15, wherein the one or more processors are further configured to
determine the picture QP value based on a base QP value and a hierarchical QP offset value,
wherein to determine the intermediate chroma QP offset value for the chroma QP value, the one or more processors are further configured to determine the intermediate chroma QP offset value for the chroma QP value based on the picture QP value and the lookup table.

18. The apparatus of claim 17, wherein to determine the chroma QP value as the second function of the intermediate chroma QP offset value, the one or more processors are further configured to:

determine the chroma QP value based on the picture QP value, the intermediate chroma QP offset value, and a fixed chroma QP offset value.

19. The apparatus of claim 17, wherein to determine the intermediate chroma QP offset value, the one or more processors are further configured to:

determine a first intermediate chroma QP offset value for the chroma QP value based on the base QP value and the lookup table; and

determine a second intermediate chroma QP offset value for the chroma QP value based on the picture QP value and the lookup table.

20. The apparatus of claim 19, wherein to determine the chroma QP value as the second function of the intermediate chroma QP offset value, the one or more processors are further configured to:

determine the chroma QP value based on the picture QP value, the first intermediate chroma QP offset value, the second intermediate chroma QP offset value, and a fixed chroma QP offset value.

21. The apparatus of claim 15, wherein the one or more processors are further configured to:

determine the lookup table from the plurality of lookup tables based on one or more of a chroma color component or a color gamut of the picture.

22. The apparatus of claim 15, wherein the one or more processors are further configured to:

determine the lookup table from the plurality of lookup tables based on a syntax element received in an encoded video bitstream.

23. The apparatus of claim 14, wherein the one or more processors are further configured to:

determine a luma scale value for dynamic range adjustment;

determine a chroma scale value for dynamic range adjustment as a third function a base QP value, a fixed chroma QP offset value, the luma scale value, and a linearized version of the intermediate chroma QP offset value; and

perform a dynamic range adjustment on the decoded picture using the luma scale value and the chroma scale value.

24. The apparatus of claim 14, wherein the one or more processors are further configured to:

determine a luma scale value for dynamic range adjustment;

determine a chroma scale value for dynamic range adjustment as a third function a base QP value, a fixed chroma QP offset value, the luma scale value, a color gamut of the picture, and a linearized version of the intermediate chroma QP offset value; and

perform a dynamic range adjustment on the decoded picture using the luma scale value and the chroma scale value.

25. The apparatus of claim 14, wherein to determine the intermediate chroma QP offset value, the one or more processors are further configured to determine the intermediate chroma QP offset value for the chroma QP value based on a base QP value, and one or more of a QP value from a picture parameter set, and a QP value from a slice header.

26. The apparatus of claim 14, wherein the one or more processors are further configured to:
output the decoded picture for display.

27. An apparatus configured to decode video data, the apparatus comprising:
means for determining a picture quantization parameter (QP) value of the picture of video data;
means for determining an intermediate chroma QP offset value for a chroma QP value using the picture QP value and a first function based on video characteristics of the picture of video data;
means for determining the chroma QP value with a second function of the intermediate chroma QP offset value; and
means for decoding the picture of video data using the chroma QP value to produce a decoded picture.

28. The apparatus of claim 27, wherein the first function is implemented as a lookup table from a plurality of lookup tables, wherein the picture QP value is an input to the lookup table, and wherein the lookup table is based on video characteristics of the picture of video data.

29. A computer-readable storage medium storing instructions that, when executed, cause one or more processors of a device configured to decode video data to:

determine a picture quantization parameter (QP) value of the picture of video data;

determine an intermediate chroma QP offset value for a chroma QP value using the picture QP value and a first function based on video characteristics of the picture of video data;

determine the chroma QP value with a second function of the intermediate chroma QP offset value; and

decode the picture of video data using the chroma QP value to produce a decoded picture.

30. The computer-readable storage medium of claim 29, wherein the first function is implemented as a lookup table from a plurality of lookup tables, wherein the picture QP value is an input to the lookup table, and wherein the lookup table is based on video characteristics of the picture of video data.