CLAIMS

1. A method of decoding video data, the method comprising:

context decoding syntax elements for a first set of transform coefficients of a transform coefficient group until a maximum number of regular coded bins is reached, wherein the context decoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2;

bypass decoding additional syntax elements for a second set of coefficients in response to reaching the maximum number of regular coded bins, wherein bypass decoding the additional syntax elements comprises:

receiving a prefix value for a level value of a transform coefficient of the second set of coefficients;

decoding the prefix value using Golomb-Rice coding;

in response to a length of the prefix value being equal to a threshold length, receiving a suffix value for the level value of the transform coefficient, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

decoding the suffix value using exponential Golomb coding;

determining level values for the first set of coefficients of the transform unit based on the context decoded syntax elements; and

determining level values for the second set of coefficients of the transform unit based on the additional syntax elements, wherein determining the level values for the second set of coefficients of the transform unit based on the additional syntax elements comprises determining the level value of the transform coefficient based on the decoded prefix value and the decoded suffix value.

2. The method of claim 1, wherein determining the level value of the transform coefficient comprises:

adding the decoded prefix value to the decoded suffix value.

3. The method of claim 1, wherein bypass decoding the additional syntax elements further comprises:

receiving a second prefix value for a level value of a second coefficient of the second set of coefficients;

decoding the second prefix value using Golomb-Rice coding;

in response to a length of the second prefix value being less than the threshold length, determining the level value of the second coefficient without receiving a suffix value for the level value of the second coefficient.

4. The method of claim 1, wherein bypass decoding the additional syntax elements further comprises:

determining a value for a Rice parameter for the transform coefficient; and

determining the threshold length based on the value for the Rice parameter.

5. The method of claim 1, wherein context decoding the syntax elements of the transform coefficient group comprises performing context-adaptive binary arithmetic decoding to decode the syntax elements of the transform coefficient group.

6. The method of claim 1, wherein the level value of the transform coefficient comprises an absolute level value.

7. The method of claim 1, wherein the level value of the transform coefficient comprises a remaining level value.

8. The method of claim 1, wherein the threshold length is equal to 5.

9. The method of claim 1, wherein the threshold length is equal to 6.

10. The method of claim 1, further comprising:

determining a decoded transform block based on the level values for the first set of coefficients and the level values for the second set of coefficients;

adding the decoded transform block to a prediction block to determine a reconstructed block;

performing one or more filtering operations on the reconstructed block to determine a decoded block of video data; and

outputting a decoded picture of video data that includes the decoded block of video data.

11. A device for decoding video data, the device comprising:

a memory configured to store video data; and

one or more processors implemented in circuitry and configured to:

context decode syntax elements for a first set of coefficients of a transform coefficient group until a maximum number of regular coded bins is reached, wherein the context decoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2;

bypass decode additional syntax elements for a second set of coefficients in response to reaching the maximum number of regular coded bins, wherein to bypass decode the additional syntax elements, the one or more processors are configured to:

receive a prefix value for a level value of a transform coefficient of the second set of coefficients;

decode the prefix value using Golomb-Rice coding;

in response to a length of the prefix value being equal to a threshold length, receive a suffix value for the level value of the transform coefficient, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

decode the suffix value using exponential Golomb coding;

determine level values for the first set of coefficients of the transform unit based on the context decoded syntax elements; and

determine level values for the second set of coefficients of the transform unit based on the additional syntax elements, wherein to determine the level values for the

second set of coefficients of the transform unit based on the additional syntax elements, the one or more processors are configured to determine the level value of the transform coefficient based on the decoded prefix value and the decoded suffix value.

12. The device of claim 11, wherein to determine the level value of the transform coefficient, the one or more processors are configured to:
add the decoded prefix value to the decoded suffix value.

13. The device of claim 11, wherein to bypass decode the additional syntax elements, the one or more processors are configured to:

receive a second prefix value for a second coefficient of the second set of coefficients;

decode the second prefix value using Golomb-Rice coding;

in response to a length of the second prefix value being less than the threshold length, determine a level value of the second coefficient without receiving a suffix value for the second coefficient.

14. The device of claim 11, wherein to bypass decode the additional syntax elements, the one or more processors are configured to:

determine a value for a Rice parameter for the transform coefficient; and

determine the threshold length based on the value for the Rice parameter.

15. The device of claim 11, wherein to context decode the syntax elements of the transform coefficient group, the one or more processors are configured to perform context-adaptive binary arithmetic decoding to decode the syntax elements of the transform coefficient group.

16. The device of claim 11, wherein the level value of the transform coefficient comprises an absolute level value.

17. The device of claim 11, wherein the level value of the transform coefficient comprises a remaining level value.

18. The device of claim 11, wherein the threshold length is equal to 5.

19. The device of claim 11, wherein the threshold length is equal to 6.

20. The device of claim 11, wherein the one or more processors are configured to:

determine a decoded transform block based on the level values for the first set of coefficients and the level values for the second set of coefficients;

add the decoded transform block to a prediction block to determine a reconstructed block;

perform one or more filtering operations on the reconstructed block to determine a decoded block of video data; and

output a decoded picture of video data that includes the decoded block of video data.

21. A method of encoding video data, the method comprising:

determining level values for coefficients of a transform coefficient group;

context encoding syntax elements for a first set of coefficients of the transform coefficient group until a maximum number of regular coded bins is reached, wherein the context encoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2;

bypass encoding additional syntax elements for a second set of coefficients of the transform coefficient group in response to reaching the maximum number of regular coded bins, wherein bypass encoding the additional syntax elements comprises:

determining a level value of a transform coefficient of the second set of coefficients;

in response to the level value of the transform coefficient being greater than a threshold length, encoding a prefix value for the level value of the transform coefficient using Golomb-Rice coding, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

in response to the level value being greater than the threshold length, encoding a suffix value for the level value of the transform coefficient using exponential Golomb coding.

22. The method of claim 21, further comprising:

determining the suffix value by subtracting the prefix value from the level value of the transform coefficient.

23. The method of claim 21, wherein bypass encoding the additional syntax elements further comprises:

determining a second level value for a second coefficient of the second set of coefficients;

in response to the second level value being less than the threshold length, encoding a prefix value for the second coefficient using Golomb-Rice coding without encoding a suffix value for the second coefficient.

24. The method of claim 21, wherein bypass encoding the additional syntax elements further comprises:

determining a value for a Rice parameter for the transform coefficient; and

determining the threshold length based on the value for the Rice parameter.

25. The method of claim 21, wherein context encoding the syntax elements of the transform coefficient group comprises performing context-adaptive binary arithmetic encoding to encode the syntax elements of the transform coefficient group.

26. The method of claim 21, wherein the level value of the transform coefficient comprises an absolute level value.

27. The method of claim 21, wherein the level value of the transform coefficient comprises a remaining level value.

28. The method of claim 21, wherein the threshold length is equal to 5.

29. The method of claim 21, wherein the threshold length is equal to 6.

30. A device for encoding video data, the device comprising:

a memory configured to store video data; and

one or more processors implemented in circuitry and configured to:

determine level values for coefficients of a transform coefficient group;

context encode syntax elements for a first set of coefficients of the transform coefficient group until a maximum number of regular coded bins is reached, wherein the context encoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2; and

bypass encode additional syntax elements for a second set of coefficients of the transform coefficient group in response to reaching the maximum number of regular coded bins, wherein bypass encoding the additional syntax elements comprises:

determine a level value of a transform coefficient of the second set of coefficients;

in response to the level value of the transform coefficient being greater than a threshold length, encode a prefix value for the level value of the transform coefficient using Golomb-Rice coding, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

in response to the level value being greater than the threshold length, encode a suffix value for the level value of the transform coefficient using exponential Golomb coding.

31. The device of claim 30, wherein the one or more processors are further configured to:

determine the suffix value by subtracting the prefix value from the level value of the transform coefficient.

32. The device of claim 30, wherein to bypass encode the additional syntax elements, the one or more processors are further configured to:

determine a second level value for a second coefficient of the second set of coefficients;

in response to the second level value being less than the threshold length, encode a prefix value for the second coefficient using Golomb-Rice coding without encoding a suffix value for the second coefficient.

33. The device of claim 30, wherein to bypass encode the additional syntax elements the one or more processors are further configured to:

determine a value for a Rice parameter for the transform coefficient; and

determine the threshold length based on the value for the Rice parameter.

34. The device of claim 30, wherein to context encode the syntax elements of the transform coefficient group, the one or more processors are configured to perform context-adaptive binary arithmetic encoding to encode the syntax elements of the transform coefficient group.

35. The device of claim 30, wherein the level value of the transform coefficient comprises an absolute level value.

36. The device of claim 30, wherein the level value of the transform coefficient comprises a remaining level value.

37. The device of claim 30, wherein the threshold length is equal to 5.

38. The device of claim 30, wherein the threshold length is equal to 6.

39. A non-transitory computer readable storage medium storing instructions that when executed by one or more processors cause the one or more processors to:

context decode syntax elements for a first set of transform coefficients of a transform coefficient group until a maximum number of regular coded bins is reached, wherein the context decoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2;

bypass decode additional syntax elements for a second set of coefficients in response to reaching the maximum number of regular coded bins, wherein to bypass decode the additional syntax elements, the instructions cause the one or more processors to:

receive a prefix value for a level value of a transform coefficient of the second set of coefficients;

decode the prefix value using Golomb-Rice coding;

in response to a length of the prefix value being equal to a threshold length, receive a suffix value for the level value of the transform coefficient, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

decode the suffix value using exponential Golomb coding;

determine level values for the first set of coefficients of the transform unit based on the context decoded syntax elements; and

determine level values for the second set of coefficients of the transform unit based on the additional syntax elements, wherein determining the level values for the second set of coefficients of the transform unit based on the additional syntax elements comprises determining the level value of the transform coefficient based on the decoded prefix value and the decoded suffix value.

40. An apparatus for decoding video data, the apparatus comprising:

means for context decoding syntax elements for a first set of transform coefficients of a transform coefficient group until a maximum number of regular coded bins is reached, wherein the context decoded syntax elements comprise one or more significance flags, one or more parity level flags, and one or more first flags, wherein each of the one or more significance flags indicate if an absolute level for a transform coefficient is equal to zero, each of the one or more parity level flags indicates if a transform coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a transform coefficient has an absolute level that is greater than 2;

means for bypass decoding additional syntax elements for a second set of coefficients in response to reaching the maximum number of regular coded bins, wherein the means for bypass decoding the additional syntax elements comprises:

means for receiving a prefix value for a level value of a transform coefficient of the second set of coefficients;

means for decoding the prefix value using Golomb-Rice coding;

means for receiving a suffix value for the level value of the transform coefficient in response to a length of the prefix value being equal to a threshold length, wherein the threshold length is a fixed value for all transform coefficients of the second set of coefficients; and

means for decoding the suffix value using exponential Golomb coding;

means for determining level values for the first set of coefficients of the transform unit based on the context decoded syntax elements; and

means for determining level values for the second set of coefficients of the transform unit based on the additional syntax elements, wherein determining the level values for the second set of coefficients of the transform unit based on the additional syntax elements comprises determining the level value of the transform coefficient based on the decoded prefix value and the decoded suffix value.