CLAIMS

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

determining a threshold number of regular coded bins for a first decoding pass for a transform block;

for a first set of coefficients of the transform block, context decoding syntax elements of a coefficient group until the threshold 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 coefficient is equal to zero, each of the one or more parity level flags indicates if a coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a coefficient has an absolute level that is greater than 2;

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

deriving a value for a Rice parameter based on a sum of absolute values of neighboring coefficients to the coefficient of the second set of coefficients;

determining, based on the value for the Rice parameter, a variable threshold for switching between bypass decoding a value for the coefficient of the second set of coefficients using Golomb-Rice coding and bypass decoding the value for the coefficient of the second set of coefficients using Exponential-Golomb coding, wherein the variable threshold corresponds to a variable number of bins that are to be decoded using Golomb-Rice coding; and

based on the variable threshold, determining whether to bypass decode the value for the coefficient of the second set of coefficients using Golomb-Rice coding or bypass decode the value for the coefficient of the second set of coefficients using Exponential-Golomb coding;

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

determining values for the second set of coefficients based on the additional syntax elements.

2. The method of claim 1, further comprising:

determining the value for the Rice parameter from a look up table.

3. The method of claim 2, further comprising:

identifying an entry in the look up table corresponding to the value for the Rice parameter based on a sum of absolute values of coefficients in a neighborhood around the coefficient of the second set of coefficients.

4. The method of claim 3, wherein the neighborhood comprises five coefficients.

5. The method of claim 4, wherein the five coefficients comprise three coefficients adjacent to the coefficient of the second set of coefficients.

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

7. The method of claim 1, wherein context decoding syntax elements of a coefficient group until the threshold number of regular coded bins is reached comprises:

determining that the threshold number of regular coded bins has been reached while coding a syntax element for a coefficient of the first set of coefficients;

context decoding one or more remaining syntax elements for the coefficient of the first set of coefficients.

8. The method of claim 1, further comprising:

determining a decoded transform block based on the values for the first set of coefficients and the 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.

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

determining a threshold number of regular coded bins for a first decoding pass for a transform block;

for a first set of coefficients of the transform block, context encoding syntax elements of a coefficient group until the threshold 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 coefficient is equal to zero, each of the one or more parity level flags indicates if a coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a coefficient has an absolute level that is greater than 2;

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

deriving a value for a Rice parameter based on a sum of absolute values of neighboring coefficients to the coefficient of the second set of coefficients;

determining, based on the value for the Rice parameter, a variable threshold for switching between bypass encoding a value for the coefficient of the second set of coefficients using Golomb-Rice coding and bypass encoding the value for the coefficient of the second set of coefficients using Exponential-Golomb coding, wherein the variable threshold corresponds to a variable number of bins that are to be decoded using Golomb-Rice coding; and

based on the variable threshold, determining whether to bypass encode the value for the coefficient of the second set of coefficients using Golomb-Rice coding or bypass encode the value for the coefficient of the second set of coefficients using Exponential-Golomb coding.

10. The method of claim 9, further comprising:

determining the value for the Rice parameter from a look up table.

11. The method of claim 10, further comprising:

identifying an entry in the look up table corresponding to the value for the Rice parameter based on a sum of absolute values of coefficients in a neighborhood around the coefficient of the second set of coefficients.

12. The method of claim 11, wherein the neighborhood comprises five coefficients.

13. The method of claim 12, wherein the five coefficients comprise three coefficients adjacent to the coefficient of the second set of coefficients.

14. The method of claim 9, wherein context encoding the syntax elements of the coefficient group comprises performing context-adaptive binary arithmetic encoding to encode the syntax elements of the coefficient group.

15. The method of claim 9, wherein context encoding syntax elements of a coefficient group until the threshold number of regular coded bins is reached comprises:

determining that the threshold number of regular coded bins has been reached while coding a syntax element for a coefficient of the first set of coefficients;

context encoding one or more remaining syntax elements for the coefficient of the first set of coefficients.

16. The method of claim 9, further comprising:

outputting a bitstream of encoded video data that includes the context encoded syntax elements and the bypass encoded additional syntax elements.

17. 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:

determine a threshold number of regular coded bins for a first decoding pass for a transform block;

for a first set of coefficients of the transform block, context decode syntax elements of a coefficient group until the threshold 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 coefficient is equal to zero, each of the one or more parity level flags indicates if a coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a coefficient has an absolute level that is greater than 2;

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

derive a value for a Rice parameter based on a sum of absolute values of neighboring coefficients to the coefficient of the second set of coefficients;

determine, based on the value for the Rice parameter, a variable threshold for switching between bypass decoding a value for the coefficient of the second set of coefficients using Golomb-Rice coding and bypass decoding the value for the coefficient of the second set of coefficients using Exponential-Golomb coding, wherein the variable threshold corresponds to a variable number of bins that are to be decoded using Golomb-Rice coding; and

based on the variable threshold, determine whether to bypass decode the value for the coefficient of the second set of coefficients using Golomb-Rice coding or bypass decode the value for the coefficient of the second set of coefficients using Exponential-Golomb coding;

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

determine values for the second set of coefficients based on the additional syntax elements.

18. The device of claim 17, wherein the one or more processors are further configured to:

determine the value for the Rice parameter from a look up table.

19. The device of claim 18, wherein the one or more processors are further configured to:

identify an entry in the look up table corresponding to the value for the Rice parameter based on a sum of absolute values of coefficients in a neighborhood around the coefficient of the second set of coefficients.

20. The device of claim 19, wherein the neighborhood comprises five coefficients.

21. The device of claim 20, wherein the five coefficients comprise three coefficients adjacent to the coefficient of the second set of coefficients.

22. The device of claim 17, wherein to context decode the syntax elements of the coefficient group, the one or more processors are further configured to

perform context-adaptive binary arithmetic decoding to decode the syntax elements of the coefficient group.

23. The device of claim 17, wherein to context decode syntax elements of a coefficient group until the threshold number of regular coded bins is reached, the one or more processors are further configured to:

determine that the threshold number of regular coded bins has been reached while coding a syntax element for a coefficient of the first set of coefficients;

context decode one or more remaining syntax elements for the coefficient of the first set of coefficients.

24. The device of claim 17, wherein the one or more processors are further configured to:

determine a decoded transform block based on the values for the first set of coefficients and the 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.

25. 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 a threshold number of regular coded bins for a first decoding pass for a transform block;

for a first set of coefficients of the transform block, context encode syntax elements of a coefficient group until the threshold 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 coefficient is equal to zero, each of the one or more parity level flags indicates if a coefficient has an absolute level that is even or odd, and each of the one or more first flags indicates if a coefficient has an absolute level that is greater than 2; and

in response to reaching the threshold number of regular coded bins, for a second set of coefficients of the transform block, bypass encode additional syntax elements, wherein to bypass encode the additional syntax elements, the one or more processors are further configured to, for a coefficient of the second set of coefficients:

derive a value for a Rice parameter based on a sum of absolute values of neighboring coefficients to the coefficient of the second set of coefficients; determine, based on the value for the Rice parameter, a variable threshold for switching between bypass encoding a value for the coefficient of the second set of coefficients using Golomb-Rice coding and bypass encoding the value for the coefficient of the second set of coefficients using Exponential-Golomb coding, wherein the variable threshold corresponds to a variable number of bins that are to be decoded using Golomb-Rice coding; and

based on the variable threshold, determine whether to bypass encode the value for the coefficient of the second set of coefficients using Golomb-Rice coding or bypass encode the value for the coefficient of the second set of coefficients using Exponential-Golomb coding.

26. The device of claim 25, wherein the one or more processors are further configured to:

determine the value for the Rice parameter from a look up table.

27. The device of claim 26, wherein the one or more processors are further configured to:

identify an entry in the look up table corresponding to the value for the Rice parameter based on a sum of absolute values of coefficients in a neighborhood around the coefficient of the second set of coefficients.

28. The device of claim 27, wherein the neighborhood comprises five coefficients.

29. The device of claim 28, wherein the five coefficients comprise three coefficients adjacent to the coefficient of the second set of coefficients.

30. The device of claim 25, wherein to context encode the syntax elements of the coefficient group, the one or more processors are configured to perform context-adaptive binary arithmetic encoding to encode the syntax elements of the coefficient group.

31. The device of claim 25, wherein to context encode syntax elements of a coefficient group until the threshold number of regular coded bins is reached, the one or more processors are configured to:

determine that the threshold number of regular coded bins has been reached while coding a syntax element for a coefficient of the first set of coefficients;

context encode one or more remaining syntax elements for the coefficient of the first set of coefficients.

32. The device of claim 25, wherein the one or more processors are further configured to:

output a bitstream of encoded video data that includes the context encoded syntax elements and the bypass encoded additional syntax elements.