CLAIMS

~~What is claimed is:~~

1. A link monitoring method, wherein the method comprises:

receiving outer-code encoded data;

performing inner-code encoding on the outer-code encoded data, and outputting inner-code encoded data;

performing outer-code decoding on the outer-code encoded data; and

determining, based on a status of performing outer-code decoding on the outer-code encoded data, quality of a link for transmission of the outer-code encoded data.

2. The method according to claim 1, wherein the determining, based on a status of performing outer-code decoding on the outer-code encoded data, quality of a link for transmission of the outer-code encoded data comprises:

determining a quantity of erroneous symbols in each of P1 codeword sequences based on a status of performing outer-code decoding on the P1 codeword sequences of the outer-code encoded data, wherein P1 is a positive integer; and

determining the quality of the link based on a quantity of erroneous symbols in the P1 codeword sequences.

3. The method according to claim 1, wherein the determining, based on a status of performing outer-code decoding on the outer-code encoded data, quality of a link for transmission of the outer-code encoded data comprises:

determining, based on a status of performing outer-code decoding on a codeword sequence of the outer-code encoded data, an indication parameter corresponding to the codeword sequence; and

determining the quality of the link based on indication parameters corresponding to P2 codeword sequences of the outer-code encoded data, wherein P2 is a positive integer.

4. The method according to any one of claims 1 to 3, wherein outer-code decoded data is data on which outer-code encoding and de-skewing are performed.

5. The method according to any one of claims 1 to 4, wherein the outer-code decoded data is data on which outer-code encoding, lane reordering, and first de-interleaving are performed.

6. The method according to any one of claims 1 to 5, wherein the outer-code decoded data is data on which outer-code encoding and data extraction are performed.

7. The method according to any one of claims 1 to 6, wherein the inner-code encoded data is data on which outer-code encoding is performed.

8. The method according to any one of claims 1 to 6, wherein the inner-code encoded data is

data on which outer-code encoding and de-skewing are performed.

9. The method according to any one of claims 1 to 6, wherein the inner-code encoded data is data on which outer-code encoding, de-skewing, and lane reordering are performed.

10. The method according to any one of claims 1 to 6, wherein the inner-code encoded data is data on which outer-code encoding, de-skewing, lane reordering, and first de-interleaving are performed.

11. The method according to any one of claims 1 to 10, wherein the inner-code encoded data is data on which outer-code encoding and data processing are performed, and the data processing comprises first interleaving.

12. A link monitoring method, wherein the method comprises:

receiving outer-code encoded and inner-code encoded data;

performing inner-code decoding on the outer-code encoded and inner-code encoded data, and outputting inner-code decoded data;

performing outer-code decoding on the inner-code decoded data; and

determining, based on a status of performing outer-code decoding on the inner-code decoded data, quality of a link for transmission of the outer-code encoded and inner-code encoded data.

13. The method according to claim 12, wherein the determining, based on a status of performing outer-code decoding on the inner-code decoded data, quality of a link for transmission of the outer-code encoded and inner-code encoded data comprises:

determining a quantity of erroneous symbols in each of P3 codeword sequences based on a status of performing outer-code decoding on the P3 codeword sequences of the inner-code decoded data, wherein P3 is a positive integer; and

determining the quality of the link based on a quantity of erroneous symbols in the P3 codeword sequences.

14. The method according to claim 12, wherein the determining, based on a status of performing outer-code decoding on the inner-code decoded data, quality of a link for transmission of the outer-code encoded and inner-code encoded data comprises:

determining, based on a status of performing outer-code decoding on a codeword sequence of the inner-code decoded data, an indication parameter corresponding to the codeword sequence; and

determining the quality of the link based on indication parameters corresponding to P4 codeword sequences of the inner-code decoded data, wherein P4 is a positive integer.

15. The method according to any one of claims 12 to 14, wherein outer-code decoded data is data on which inner-code decoding and de-skewing are performed.

16. The method according to any one of claims 12 to 15, wherein the outer-code decoded data

is data on which inner-code decoding and first de-interleaving are performed.

17. The method according to any one of claims 12 to 16, wherein the outer-code decoded data is data on which inner-code decoding, lane reordering, and first de-interleaving are performed.

18. The method according to any one of claims 12 to 17, wherein the outer-code decoded data is data on which inner-code decoding and data extraction are performed.

19. The method according to any one of claims 12 to 18, ~~wherein the inner-code decoded data is data on which data processing is performed, the outer-code decoded data is data on which inner-code decoding and inverse processing of the data processing are performed, the data processing comprises first interleaving, and the inverse processing comprises second de-interleaving.~~wherein outer-code encoded and inner-code encoded data is data on which data processing is performed after the outer-code coding and before the inner-code coding, wherein the data processing comprises first interleaving; and

after the inner-code decoding and before the outer-code decoding, the method further comprises:

performing inverse processing of the data processing on the inner-code decoded data, wherein the inverse processing comprises second de-interleaving.

20. The method according to any one of claims 12 to 19, wherein the output data is data on which inner-code decoding is performed.

21. The method according to any one of claims 12 to 19, ~~wherein the inner-code decoded data is the data on which data processing is performed, the output data is the data on which inner-code decoding and inverse processing of the data processing are performed, the data processing comprises first interleaving, and the inverse processing comprises second de-interleaving.~~wherein the outer-code encoded and inner-code encoded data is data on which data processing is performed after the outer-code coding and before the inner-code coding, wherein the data processing comprises first interleaving; and

after the inner-code decoding and before the outer-code decoding, the method further comprises:

performing inverse processing of the data processing on the inner-code decoded data, wherein the inverse processing comprises second de-interleaving; and

outputting the inner-code decoded and inverse processed data.

22. A link monitoring apparatus, configured to implement the method according to any one of claims 1 to 21.

23. A communication system, comprised a first device and a second device, wherein the first device is configured to implement the method according to any one of claims 1 to 11, and the second device is configured to implement the method according to any one of claims 12 to 21.

wherein the apparatus comprises:

an input unit, configured to receive outer-code encoded data;

an encoding unit, configured to perform inner-code encoding on the outer-code encoded data; and

an output unit, configured to output inner-code encoded data; and

a decoding unit, configured to perform outer-code decoding on the outer-code encoded data, wherein

the decoding unit is further configured to determine, based on a status of performing outer-code decoding on the outer-code encoded data, quality of a link for transmission of the outer-code encoded data.

23. The apparatus according to claim 22, wherein the decoding unit is specifically configured to:

determine a quantity of erroneous symbols in each of P1 codeword sequences based on a status of performing outer-code decoding on the P1 codeword sequences of the outer-code encoded data, wherein P1 is a positive integer; and

determine the quality of the link based on a quantity of erroneous symbols in the P1 codeword sequences.

24. The apparatus according to claim 22, wherein the decoding unit is specifically configured to:

determine, based on a status of performing outer-code decoding on a codeword sequence of the outer-code encoded data, an indication parameter corresponding to the codeword sequence; and

determine the quality of the link based on indication parameters corresponding to P2 codeword sequences of the outer-code encoded data, wherein P2 is a positive integer.

25. The apparatus according to any one of claims 22 to 24, wherein outer-code decoded data is data on which outer-code encoding and de-skewing are performed.

26. The apparatus according to any one of claims 22 to 25, wherein the outer-code decoded data is data on which outer-code encoding, lane reordering, and first de-interleaving are performed.

27. The apparatus according to any one of claims 22 to 26, wherein the outer-code decoded data is data on which outer-code encoding and data extraction are performed.

28. The apparatus according to any one of claims 22 to 27, wherein the inner-code encoded data is data on which outer-code encoding is performed.

29. The apparatus according to any one of claims 22 to 27, wherein the inner-code encoded data is data on which outer-code encoding and de-skewing are performed.

30. The apparatus according to any one of claims 22 to 27, wherein the inner-code encoded

~~data is data on which outer-code encoding, de-skewing, and lane reordering are performed.~~

~~31. The apparatus according to any one of claims 22 to 27, wherein the inner-code encoded data is data on which outer-code encoding, de-skewing, lane reordering, and first de-interleaving are performed.~~

~~32. The apparatus according to any one of claims 22 to 31, wherein the inner-code encoded data is data on which outer-code encoding and data processing are performed, and the data processing comprises first interleaving.~~

~~33. A link monitoring apparatus, wherein the apparatus comprises:~~

~~an input unit, configured to receive outer-code encoded and inner-code encoded data;~~

~~a first decoding unit, configured to perform inner-code decoding on the outer-code encoded and inner-code encoded data;~~

~~an output unit, configured to output inner-code decoded data; and~~

~~a second decoding unit, configured to perform outer-code decoding on the inner-code decoded data, wherein~~

~~the second decoding unit is further configured to determine, based on a status of performing outer-code decoding on the inner-code decoded data, quality of a link for transmission of the outer-code encoded and inner-code encoded data.~~

~~34. The apparatus according to claim 33, wherein the second decoding unit is specifically configured to:~~

~~determine a quantity of erroneous symbols in each of P3 codeword sequences based on a status of performing outer-code decoding on the P3 codeword sequences of the inner-code decoded data, wherein P3 is a positive integer; and~~

~~determine the quality of the link based on a quantity of erroneous symbols in the P3 codeword sequences.~~

~~35. The apparatus according to claim 33, wherein the second decoding unit is specifically configured to:~~

~~determine, based on a status of performing outer-code decoding on a codeword sequence of the inner-code decoded data, an indication parameter corresponding to the codeword sequence; and~~

~~determine the quality of the link based on indication parameters corresponding to P4 codeword sequences of the inner-code decoded data, wherein P4 is a positive integer.~~

~~36. The apparatus according to any one of claims 33 to 35, wherein outer-code decoded data is data on which inner-code decoding and de-skewing are performed.~~

~~37. The apparatus according to any one of claims 33 to 36, wherein the outer-code decoded data is data on which inner-code decoding and first de-interleaving are performed.~~

~~38. The apparatus according to any one of claims 33 to 37, wherein the outer-code decoded data is data on which inner-code decoding, lane reordering, and first de-interleaving are performed.~~

~~39. The apparatus according to any one of claims 33 to 38, wherein the outer-code decoded data is data on which inner-code decoding and data extraction are performed.~~

~~40. The apparatus according to any one of claims 33 to 39, wherein the inner-code decoded data is data on which data processing is performed, the outer-code decoded data is data on which inner-code decoding and inverse processing of the data processing are performed, the data processing comprises first interleaving, and the inverse processing comprises second de-interleaving.~~

~~41. The apparatus according to any one of claims 33 to 40, wherein the output data is data on which inner-code decoding is performed.~~

~~42. The apparatus according to any one of claims 33 to 40, wherein the inner-code decoded data is the data on which data processing is performed, the output data is the data on which inner-code decoding and inverse processing of the data processing are performed, the data processing comprises first interleaving, and the inverse processing comprises second de-interleaving.~~

~~43. A computer device, comprising a memory and a processor, wherein the memory stores program instructions, and the processor runs the program instructions, to perform the method according to any one of claims 1 to 21.~~

~~44. A computer-readable storage medium, comprising program instructions, wherein when the program instructions are run on a computer device, the computer device is enabled to perform the method according to any one of claims 1 to 21.~~

~~45. A computer program product, wherein when the computer program product runs on a computer, the computer is enabled to perform the method according to any one of claims 1 to 21.~~