CLAIMS

1. A polar code encoding method, comprising:

obtaining, by an encoding apparatus, K to-be-encoded bits, a mother code length N, and a first sequence, wherein the first sequence comprises sequence numbers of N polarized subchannels, the sequence numbers of the N polarized subchannels are arranged in the first sequence based on reliability of the N polarized subchannels, $N = 2^n$, $K \leq N$, N is greater than or equal to 32, and K, n, and N are positive integers;

determining, based on the first sequence, K polarized subchannels used to contain the K to-be-encoded bits, and performing polarization encoding on the K to-be-encoded bits to obtain an encoded bit sequence;

performing rate matching on the encoded sequence to obtain a rate-matched sequence; and

outputting the rate-matched sequence, wherein

the first sequence is a second sequence or a subsequence of a second sequence, the second sequence comprises sequence numbers of N_{max} polarized subchannels, the sequence numbers of the N_{max} polarized subchannels are arranged in the second sequence based on reliability of the N_{max} polarized subchannels, N is less than or equal to N_{max}, and $N_{max} = 2^{n_{max}}$, wherein n_{max} is a positive integer, n is less than or equal to n_{max}, and the second sequence is any sequence of the Qx-y sequences whose length is N_{max} in the appendix, wherein x is 5, and y is any one of 2048, 4096, 8192 and 16384.

2. A polar code decoding method, comprising:

obtaining, by a decoding apparatus, a to-be-decoded information sequence, wherein the to-be-decoded information sequence comprises K to-be-decoded bits;

determining a mother code length N and a first sequence, wherein the first sequence comprises sequence numbers of N polarized subchannels, the sequence numbers of the N polarized subchannels are arranged in the first sequence based on reliability of the N polarized subchannels, $N = 2^n$, $K \leq N$, N is greater than or equal to 32, and K, n, and N are positive integers;

determining, based on the first sequence, K polarized subchannels used to contain the K to-be-decoded bits, and decoding the to-be-decoded information sequence to obtain a decoding result; and

outputting the decoding result, wherein

the first sequence is a second sequence or a subsequence of a second sequence, the second sequence comprises sequence numbers of N_{max} polarized subchannels, the sequence numbers of the N_{max} polarized subchannels are arranged in the second sequence based on reliability of the N_{max} polarized subchannels, N is less than or equal to N_{max},

and $N_{max} = 2^{n_{max}}$, wherein n_{max} is a positive integer, n is less than or equal to n_{max}, and the second sequence is any sequence of the Qx-y sequences whose length is N_{max} in the appendix, wherein x is 5, and y is any one of 2048, 4096, 8192 and 16384.

3. The method according to any one of claims 1 to 2, wherein the K to-be-encoded bits comprise a cyclic redundancy check bit.

4. The method according to any one of claims 1 to 3, wherein the K to-be-encoded bits comprise a parity check bit.

5. The method according to any one of claims 1 to 4, wherein the determining, based on the first sequence, K polarized subchannels used to contain the K to-be-encoded bits is: when M is less than or equal to N, mapping the K to-be-encoded bits to the K polarized subchannels with high reliability in M − P non-punctured polarized subchannels to enable reliability of the polarized subchannels containing the K to-be-encoded bits to be higher than reliability of remaining M − P − K polarized subchannels, wherein M is a target code length, P is a quantity of pre-frozen polarized subchannels, and P is greater than or equal to 0.

6. The method according to any one of claims 1 to 5, wherein the first sequence is prestored.

7. The method according to any one of claims 1 to 6, wherein the sequence numbers of the N polarized subchannels are 0 to (N − 1) or 1 to N.

8. A polar code encoding apparatus, comprising:

an obtaining unit, configured to obtain K to-be-encoded bits, wherein K is a positive integer;

an encoding unit, configured to: determine a mother code length N and a first sequence, determine, based on the first sequence, K polarized subchannels used to contain the K to-be-encoded bits, and perform polar encoding on the K to-be-encoded bits to obtain an encoded bit sequence, wherein the first sequence comprises sequence numbers of N polarized subchannels, the sequence numbers of the N polarized subchannels are arranged in the first sequence based on reliability of the N polarized subchannels, $N = 2^n$, $K \leq N$, N is greater than or equal to 32, and K, n, and N are positive integers; and

a rate matching unit, configured to: perform rate matching on the encoded bit sequence, and obtain and output a rate-matched bit sequence;

wherein the first sequence is a second sequence or a subsequence of a second sequence, the second sequence comprises sequence numbers of N_{max} polarized subchannels, the sequence numbers of the N_{max} polarized subchannels are arranged in the second sequence based on reliability of the N_{max} polarized subchannels, N is less than or equal to N_{max}, and $N_{max} = 2^{n_{max}}$, wherein n_{max} is a positive integer, n is less than or equal to n_{max}, and the second sequence is any sequence of the Qx-y sequences whose length is N_{max} in the appendix, wherein x is 5, and y is any one of 2048,

4096, 8192 and 16384.

9. A polar code decoding apparatus, comprising:

an obtaining unit, configured to obtain a to-be-decoded information sequence, wherein the to-be-decoded information sequence comprises K to-be-decoded bits; and

a processing unit, configured to: determine a mother code length N and a first sequence, wherein the first sequence comprises sequence numbers of N polarized subchannels, the sequence numbers of the N polarized subchannels are arranged in the first sequence based on reliability of the N polarized subchannels, $N = 2^n$, $K \leq N$, N is greater than or equal to 32, and K, n, and N are positive integers;

the processing unit is further configured to: determine, based on the first sequence, K polarized subchannels used to contain the K to-be-decoded bits, decode the to-be-decoded information sequence, and obtain and output a decoding result;

wherein the first sequence is a second sequence or a subsequence of a second sequence, the second sequence comprises sequence numbers of N_{max} polarized subchannels, the sequence numbers of the N_{max} polarized subchannels are arranged in the second sequence based on reliability of the N_{max} polarized subchannels, N is less than or equal to N_{max}, and $N_{max} = 2^{n_{max}}$, wherein n_{max} is a positive integer, n is less than or equal to n_{max}, and the second sequence is any sequence of the Qx-y sequences whose length is N_{max} in the appendix, wherein x is 5, and y is any one of 2048, 4096, 8192 and 16384.

10. The apparatus according to any one of claims 8 to 9, wherein the K to-be-encoded bits comprise a cyclic redundancy check bit.

11. The apparatus according to any one of claims 8 to 10, wherein the K to-be-encoded bits comprise a parity check bit.

12. The apparatus according to any one of claims 8 to 11, wherein the encoding unit is configured to: when M is less than or equal to N, map the K to-be-encoded bits to the K polarized subchannels with high reliability in M − P non-punctured polarized subchannels to enable reliability of the polarized subchannels containing the K to-be-encoded bits to be higher than reliability of remaining M − P − K polarized subchannels, wherein M is a target code length, P is a quantity of pre-frozen polarized subchannels, and P is greater than or equal to 0.

13. The apparatus according to any one of claims 8 to 12, wherein the first sequence is prestored.

14. The apparatus according to any one of claims 8 to 13, wherein the sequence numbers of the N polarized subchannels are 0 to (N − 1) or 1 to N.

15. A polar code encoding apparatus, comprising:

an input interface circuit, configured to obtain K to-be-encoded bits;

a logic circuit, configured to obtain a rate-matched sequence based on the K to-be-encoded bits and according to the method according to any one of claim 1 and claims 3 to 7 when dependent on claim 1; and

an output interface circuit, configured to output the rate-matched sequence.

16. A polar code encoding apparatus, comprising: a processor, configured to perform the method according to any one of claim 1 and claims 3 to 7 when dependent on claim 1.

17. The apparatus according to claim 16, further comprising: a memory, configured to store program instructions used when the processor performs the method according to any one of claim 1 and claims 3 to 7 when dependent on claim 1.

18. A polar code decoding apparatus, comprising:

an input interface circuit, configured to obtain a to-be-decoded information sequence;

a logic circuit, configured to perform a decoding operation on the to-be-decoded information sequence according to the method according to any one of claims 2, and 3 to 7 when dependent on claim 2, to obtain a decoding result; and

an output interface circuit, configured to output the decoding result.

19. A polar code decoding apparatus, comprising: a processor, configured to perform the method according to any one of claims 2, and 3 to 7 when dependent on claim 2.

20. The apparatus according to claim 19, further comprising: a memory, configured to store program instructions used when the processor performs the method according to any one of claims 2, and 3 to 7 when dependent on claim 2.

21. A computer-readable medium, wherein the computer-readable medium is configured to store computer program instructions, and when the computer program instructions are executed by a computer, the method according to any one of claims 1 to 7 is performed.

22. A program product, wherein the program product comprises computer program instructions, and when the computer program instructions are executed by a computer, the method according to any one of claims 1 to 7 is performed.

23. A communication system, comprising a polar code encoding apparatus and a polar code decoding apparatus, wherein the polar code encoding apparatus is configure to perform the method according to any one of claim 1 and claims 3 to 7 when dependent on claim 1, and the polar code decoding apparatus is configured to perform the method according to any one of claims 2, and 3 to 7 when dependent on claim 3.