

CLAIMS

1. An information transmission method, applied to a terminal and comprising:
receiving downlink control information DCI;
determining a target bit sequence of to-be-transmitted hybrid automatic repeat
5 request acknowledgement HARQ-ACK information, wherein the to-be-transmitted
HARQ-ACK information comprises first information, and the first information
comprises HARQ-ACK information that has not been successfully reported before
and that is triggered by the DCI; and
transmitting the to-be-transmitted HARQ-ACK information by using the target
10 bit sequence;
wherein the first information corresponds to at least one first downlink
transmission set, each first downlink transmission set corresponds to one trigger
process, each first downlink transmission set corresponds to at least one
HARQ-ACK sub-codebook, and each HARQ-ACK sub-codebook has one index
15 value; and
the target bit sequence comprises any one of the following:
bit sequences of HARQ-ACK sub-codebooks corresponding to index values,
wherein the bit sequences are concatenated based on an ascending order of the index
values; and
20 bit sequences of HARQ-ACK sub-codebooks, wherein the bit sequences are
concatenated based on an order of triggering time for the first information.
2. The method according to claim 1, wherein the determining a target bit
sequence of to-be-transmitted hybrid automatic repeat request acknowledgement
HARQ-ACK information comprises:
25 determining downlink assignment index DAI numbers of downlink
transmissions corresponding to the to-be-transmitted HARQ-ACK information,
wherein each of the downlink transmissions corresponding to the to-be-transmitted
HARQ-ACK information has one DAI number; and

determining the target bit sequence of the to-be-transmitted HARQ-ACK information based on the DAI numbers of the downlink transmissions corresponding to the to-be-transmitted HARQ-ACK information.

3. The method according to claim 2, wherein the DAI numbers of the downlink transmissions corresponding to the to-be-transmitted HARQ-ACK information are any one of the following:

DAI numbers that are determined based on an order of triggering time for the first information;

DAI numbers that are determined based on an order of scheduling time for downlink transmissions corresponding to the first information; and

DAI numbers that are determined based on an ascending order of numbers of downlink transmission groups, wherein the first information corresponds to at least one first downlink transmission group, each first downlink transmission group has one serial number, and an order of DAI numbers of downlink transmissions in each first downlink transmission group is determined based on a scheduling order; and DAI numbers corresponding to downlink transmission groups with adjacent numbers are contiguous before a modulo operation.

4. The method according to claim 2, wherein the to-be-transmitted HARQ-ACK information is transmitted on a same uplink resource, and the DAI numbers of the downlink transmissions corresponding to the to-be-transmitted HARQ-ACK information are contiguous before a modulo operation and increment sequentially from a smallest DAI number.

5. The method according to claim 2, wherein the to-be-transmitted HARQ-ACK information further comprises second information, and the second information is HARQ-ACK information for a downlink transmission scheduled by the DCI.

6. The method according to claim 5, wherein the DAI numbers of the downlink transmissions corresponding to the to-be-transmitted HARQ-ACK information are any one of the following:

DAI numbers that are determined based on an order of triggering times for the first information and scheduling time for downlink transmissions corresponding to the second information;

DAI numbers that are determined based on an order of scheduling time for
5 downlink transmissions that are corresponding to the first information and the second information; and

DAI numbers that are determined based on an ascending order of numbers of downlink transmission groups; wherein the first information corresponds to at least one first downlink transmission group, each first downlink transmission group has
10 one serial number, and an order of DAI numbers of downlink transmissions in each first downlink transmission group is determined based on a scheduling order; the second information corresponds to at least one second downlink transmission group, each second downlink transmission group has one serial number, and an order of DAI numbers of downlink transmissions in each second downlink transmission
15 group is determined based on a scheduling order; and DAI numbers corresponding to downlink transmission groups with adjacent numbers are contiguous before a modulo operation.

7. The method according to claim 6, wherein in a case that the DAI numbers of the downlink transmissions corresponding to the to-be-transmitted HARQ-ACK
20 information are determined based on an ascending order of the numbers of the downlink transmission groups, DAI numbers corresponding to the at least one second downlink transmission group are located at the end part of all DAI numbers.

8. The method according to claim 2, wherein the first information corresponds to at least one first downlink transmission set, each first downlink transmission set
25 corresponds to at least one first downlink transmission group, and each first downlink transmission set corresponds to one trigger process; and

the DCI comprises at least one piece of trigger information, each piece of trigger information is transmitted for one trigger process, each piece of trigger information comprises first indication information, and the first indication
30 information is used to indicate any one of the following:

a quantity of DAI numbers occupied by a corresponding first downlink transmission set; and

a quantity of DAI numbers occupied by each corresponding first downlink transmission group.

5 9. The method according to claim 8, wherein the first indication information is further used to indicate any one of the following:

a start DAI number of a corresponding first downlink transmission set;

a start DAI number of each corresponding first downlink transmission group;

an end DAI number of a corresponding first downlink transmission set; and

10 an end DAI number of each corresponding first downlink transmission group.

10. The method according to claim 1, wherein the to-be-transmitted HARQ-ACK information further comprises second information, and the second information is HARQ-ACK information for a downlink transmission scheduled by the DCI.

15 11. The method according to claim 10, wherein the first information corresponds to at least one first downlink transmission set, each first downlink transmission set corresponds to one trigger process, and each first downlink transmission set corresponds to at least one HARQ-ACK sub-codebook; and the second information corresponds to at least one second downlink transmission set,
20 each second downlink transmission set corresponds to one HARQ-ACK sub-codebook, and each HARQ-ACK sub-codebook has one index value; and

the target bit sequence comprises any one of the following:

bit sequences of HARQ-ACK sub-codebooks corresponding to index values, wherein the bit sequences are concatenated based on an ascending order of the index
25 values; and

bit sequences of HARQ-ACK sub-codebooks, wherein the bit sequences are concatenated based on an order of triggering time for the first information and scheduling time for downlink transmissions corresponding to the second information.

12. The method according to claim 11, wherein a HARQ-ACK sub-codebook corresponding to the at least one second downlink transmission set is located at the start or end part of the target bit sequence.

13. The method according to claim 11, wherein the second information
5 corresponds to one second downlink transmission set, and in a case that a dynamic codebook is used, second downlink transmission sets are in a one-to-one correspondence to downlink transmission groups.

14. The method according to claim 1 or 11, wherein the first information corresponds to one first downlink transmission set, the first downlink transmission
10 set corresponds to one HARQ-ACK sub-codebook, and the first downlink transmission set corresponds to one downlink transmission group.

15. The method according to claim 14, wherein DAI numbers are accumulated independently in each downlink transmission group.

16. The method according to claim 1 or 11, wherein the target bit sequence
15 comprises indicator bits, and the indicator bits are used to indicate index values of concatenated HARQ-ACK sub-codebooks in the target bit sequence.

17. The method according to claim 1 or 11, further comprising:
transmitting second indication information to a network device, wherein
the second indication information is used to indicate a length of each
20 HARQ-ACK sub-codebook based on a concatenating order of the target bit sequence;

and/or,
further comprising:
transmitting third indication information to a network device, wherein
25 the third indication information is used to indicate an index value of each HARQ-ACK sub-codebook based on a concatenating order of the target bit sequence;

and/or,
wherein in a case that a quantity of bits of the target bit sequence exceeds a
30 preset proportion of a quantity of all current HARQ processes, before the

transmitting the to-be-transmitted HARQ-ACK information by using the target bit sequence, the method further comprises:

determining a to-be-actually-transmitted HARQ-ACK bit sequence, wherein a quantity of bits of the to-be-actually-transmitted HARQ-ACK bit sequence is less than or equal to the quantity of all the current HARQ processes; and

the transmitting the to-be-transmitted HARQ-ACK information by using the target bit sequence comprises:

transmitting HARQ-ACK information of all the current HARQ processes by using the to-be-actually-transmitted HARQ-ACK bit sequence.

10 18. A terminal, comprising:

a receiving module, configured to receive downlink control information DCI;

a first determining module, configured to determine a target bit sequence of to-be-transmitted hybrid automatic repeat request acknowledgement HARQ-ACK information, wherein the to-be-transmitted HARQ-ACK information comprises first information, and the first information comprises HARQ-ACK information that has not been successfully reported before and that is triggered by the DCI; and

a transmitting module, configured to transmit the to-be-transmitted HARQ-ACK information by using the target bit sequence;

wherein the first information corresponds to at least one first downlink transmission set, each first downlink transmission set corresponds to one trigger process, each first downlink transmission set corresponds to at least one HARQ-ACK sub-codebook, and each HARQ-ACK sub-codebook has one index value; and

the target bit sequence comprises any one of the following:

25 bit sequences of HARQ-ACK sub-codebooks corresponding to index values, wherein the bit sequences are concatenated based on an ascending order of the index values; and

bit sequences of HARQ-ACK sub-codebooks, wherein the bit sequences are concatenated based on an order of triggering time for the first information.

19. A computer-readable storage medium, storing a computer program, wherein when the computer program is executed by a processor, the steps of the information transmission method according to any one of claims 1 to 17 are implemented.