

of a secondary cell that need to be sent in a same uplink subframe of the primary cell, determine first indication information used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe and second indication information used to indicate second feedback information of each downlink subframe of the secondary cell that needs to be sent in the uplink subframe; and a sender, configured to send mapping information of the first indication information and the second indication information in the uplink subframe, where an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

Another aspect provides a base station, which includes: a receiver, configured to receive mapping information of first indication information and second indication information sent by a user equipment in a same uplink subframe of a primary cell, where the first indication information is used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe, and the second indication information is used to indicate second feedback information of each downlink subframe of a secondary cell that needs to be sent in the uplink subframe; and a processor, configured to determine the first indication information and the second indication information according to the mapping information, determine the first feedback information according to the first indication information, and determine the second feedback information according to the second indication information, where an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

Another aspect provides a method for implementing hybrid automatic repeat request, which includes: a method for implementing hybrid automatic repeat request, which includes: performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell, so that the primary cell and the secondary cell both have feedback information corresponding to the first number of downlink subframes to send in the uplink subframe; determining first indication information used to indicate feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe and second indication information used to indicate feedback information of each downlink subframe of the secondary cell that needs to be sent in the uplink subframe according to the feedback information corresponding to the first number of downlink subframes of the primary cell and the secondary cell; and sending mapping information of the first indication information and the second indication information in the uplink subframe, where an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

FIG. 6 is a schematic flow chart of a process of implementing hybrid automatic repeat request according to Embodiment 5 of the present invention;

FIG. 7 is a schematic flow chart of a process of implementing hybrid automatic repeat request according to Embodiment 6 of the present invention;

5 FIG. 8 is a schematic flow chart of a process of implementing hybrid automatic repeat request according to Embodiment 7 of the present invention;

FIG. 9 is a schematic structural diagram of a user equipment according to Embodiment 8 of the present invention;

10 FIG. 10 is a schematic structural diagram of a base station according to Embodiment 9 of the present invention;

FIG. 11 is a schematic structural diagram of a user equipment according to Embodiment 10 of the present invention; and

FIG. 12 is a schematic structural diagram of a base station according to Embodiment 11 of the present invention.

15

DESCRIPTION OF EMBODIMENTS

The following clearly and completely describes the technical solutions in the embodiments of the present invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

It should be understood that the technical solution of the present invention is applicable to various communications systems such as a GSM (Global System ~~of~~ for Mobile communication, Global System for Mobile Communications) system, a CDMA (Code Division Multiple Access, Code Division Multiple Access) system, a WCDMA (, Wideband Code Division Multiple Access, Wideband Code Division Multiple Access) system, a GPRS (General Packet Radio Service, General Packet Wireless Service), an LTE (Long Term Evolution, Long Term Evolution) system, an LTE-A (Advanced Long Term Evolution Advanced, Long Term Evolution Advanced) system, a UMTS (Universal Mobile Telecommunications System, Universal Mobile Telecommunications System), which are not limited in the embodiments of the present invention. However, for ease of description, an LTE network is used as an example in the embodiments of the present invention for description.

Embodiments of the present invention are applicable to wireless networks of different standards. In different systems, a radio access network may include different network elements. For example, network elements in a radio access network of LTE and LTE-A include an eNB (eNodeB,

exist in the uplink subframe according to the method in LTE release 8.

A method is to add an implicit feedback information channel resource of the downlink subframe for the uplink subframe, so as to implicitly obtain the assigned feedback information channel according to the PDCCH of the downlink subframe. The newly assigned implicit feedback information channels may completely overlap, partially overlap, or do not overlap the feedback information channels assigned in LTE release 8. Therefore, because an implicit feedback information channel is also assigned to the downlink subframe, the foregoing method of the present invention can be directly used.

Another method is to semi-statically configure a plurality of feedback information channels by adopting high-layer signaling, and dynamically indicate a practically used feedback information channel by using the ARI in the PDCCH.

According to the number N of ARI bits, a base station can configure 2^N groups of feedback information channels for the UE by adopting high-layer signaling. The number of feedback information channels contained in each group equals the number of valid feedback information bits of a cell that need to be fed back in the uplink subframe. Specifically, if the number of subframes whose feedback information needs to be sent in the uplink subframe is 1, and the subframe needs to feed back only one feedback information bit, each group contains one feedback information channel. Otherwise, each group contains 2 feedback information channels. Then, the base station dynamically indicates currently which group of feedback information channels are practically assigned to the UE by using the ARI in the PDCCH.

Optionally, downlink subframes in a binding window may be processed. If an implicit feedback information channel is assigned to a subframe that sends a PDCCH according to the method of LTE release 8, an implicitly assigned feedback information channel is obtained according to the method of LTE release 8, and otherwise the ARI is used to dynamically indicate the feedback information channel. Specifically, the base station configures 2 groups of feedback information channels for the UE by adopting high-layer signaling, and each group contains 2^N feedback information channels. The ARI in the PDCCH of each subframe is only used to dynamically select a feedback information channel from a group of 2^N feedback information channels to assign it to the UE. For example, the ARI in the PDCCH where a DAI equals 1 dynamically indicates a channel from the first group of feedback information channels to assign it to the UE. The ARI in the PDCCH where the DAI equals 2 dynamically indicates a channel from the second group of feedback information channels to assign it to the UE. Alternatively, in the case that feedback information of two downlink subframes is fed back in an uplink subframe, in a natural sequence of subframe indexes or a reorganized sequence, the ARI in the PDCCH of the first subframe

information of the secondary cell that needs to be sent is labeled as a set K2. If K1 is a subset of K2, the feedback information of the subframes that are of the primary cell and belong to the set K2 but do not belong to the set K1 are permanently set to DTX, so that each cell has M2 subframes whose feedback information needs to be sent. Then, the feedback information is sent according to the method for processing a binding window being M2 in LTE release 10.

840. The UE sends the feedback information of each cell in the foregoing uplink subframe according to a channel selection mapping table that is in LTE release 10 and used to process a binding window with the size being the foregoing maximum value.

For example, in the uplink subframe, the primary cell needs to feed back feedback information of 2 subframes, whereas the secondary cell needs to feed back feedback information of 4 subframes, so that the two cells are processed together according to a method where each cell feeds back feedback information of 4 subframes, and therefore the method for sending feedback information by adopting the channel selection mapping table when the size of a binding window is 4 defined in LTE release 10 can be reused. Specifically, first, fill feedback information of 2 subframes fed back in the uplink subframe of the primary cell to obtain feedback information of 4 subframes. Next, perform space binding on the 4 subframes of the primary cell and the secondary cell to separately obtain 4 bits of feedback information. Then, perform time binding on the 4 bits of the primary cell and the secondary cell by using the foregoing table 2 to separately obtain 2 bits of feedback information. Finally, perform channel selection and mapping by adopting Table 3 and send the feedback information by using a corresponding channel.

The method in FIG. 8 uses an example in which the value of a binding window equals the actual number of downlink subframes of the cell whose feedback information needs to be sent for description.

Optionally, the following describes the embodiment of the present invention by using an example in which the value of the binding window is greater than the actual number of downlink subframes of the cell whose feedback information needs to be sent.

Depending on the method for defining a timing relationship of a feedback ~~message~~information, it is possible that a large binding window is set in an uplink subframe, that is, a subframe of a cell whose feedback information needs to be sent in the uplink subframe are a subset thereof; alternatively, subframes of two cells whose feedback information needs to be sent in the uplink subframe are subsets thereof.

For example, in FIG. 1C, the Pcell adopts a configuration 0, and the Scell adopts a configuration 1. However, a system determines a timing relationship of feedback messages according to a reference uplink and downlink configuration 2. According to the definition of the

CLAIMS

What is claimed is:

1. A method for implementing hybrid automatic repeat request, comprising:

5 determining first indication information and second indication information separately according to feedback information of each downlink subframe of a primary cell and that of a secondary cell that need to be sent in a same uplink subframe of a primary cell, wherein the first indication information is used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe, and the second indication information is used to indicate second feedback information of each downlink subframe of the secondary cell
10 that needs to be sent in the uplink subframe; and

sending mapping information of the first indication information and the second indication information in the uplink subframe, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

2. The method according to claim 1, wherein,

15 the determining first indication information and second indication information separately according to feedback information of each downlink subframe of a primary cell and that of a secondary cell that need to be sent in a same uplink subframe of a primary cell comprises:

when the number of first feedback information bits is not greater than a first preset threshold value, using the first feedback information as the first indication information, or when the number
20 of first feedback information bits is less than a first preset threshold value, performing filling on the first feedback information, so that the number of the feedback information bits after filling equals the first preset threshold value, and using the feedback information after filling as the first indication information;

when the number of the first feedback information bits is greater than the first preset threshold
25 value, performing space binding on the first feedback information, so as to obtain first space binding information,

when the number of first space binding information bits is not greater than the first preset threshold value, using the first space binding information as the first indication information, or when the number of the first space binding information bits is less than the first preset threshold
30 value, performing filling on the first space binding information, so that the number of the first space binding information bits after filling equals the first preset threshold value, and using the first space binding information after filling as the first indication information;

when the number of the first space binding information bits is greater than the first preset

threshold value, performing time binding on the first space binding information, so as to obtain first time binding information, and using the first time binding information as the first indication information;

when the number of second feedback information bits is not greater than the first preset threshold value, using the second feedback information as the second indication information, or when the number of second feedback information bits is less than the first preset threshold value, performing filling on the second feedback information, so that the number of the feedback information bits after filling equals the first preset threshold value, and using the feedback information after filling as the second indication information;

when the number of the second feedback information bits is greater than the first preset threshold value, performing space binding on the second feedback information, so as to obtain second space binding information,

when the number of the second space binding information bits is not greater than the first preset threshold value, using the second space binding information as the second indication information, or when the number of the second space binding information bits is less than the first preset threshold value, performing filling on the second space binding information, so that the number of the second space binding information bits after filling equals the first preset threshold value, and using the second space binding information after filling as the second indication information; and

when the number of the second space binding information bits is greater than the first preset threshold value, performing time binding in the second space binding information, so as to obtain second time binding information, and using the second time binding information as the second indication information.

3. The method according to claim 1, wherein,

the determining first indication information and second indication information separately according to feedback information of each downlink subframe of a primary cell and that of a secondary cell that need to be sent in a same uplink subframe of a primary cell comprises:

when the sum of the number of first feedback information bits and the number of second feedback information bits is not greater than a second preset threshold value, using the first feedback information as the first indication information, and using the second feedback information as the second indication information, wherein the second preset threshold value is twice as large as the first preset threshold value;

when the sum of the number of the first feedback information bits and the number of the second feedback information bits is greater than the second preset threshold value, performing

space binding on the first feedback information to obtain first space binding information, and performing space binding on the second feedback information to obtain second space binding information, wherein the second preset threshold value is twice as large as the first preset threshold value;

5 when the sum of the number of the first space binding information bits and the number of the second space binding information bits is not greater than the second preset threshold value, using the first space binding information as the first indication information, and using the second space binding information as the second indication information; and

10 when the sum of the number of the first space binding information bits and the number of the second space binding information bits is greater than the second preset threshold value,

if the number of the first space binding information bits is not greater than the first preset threshold value, using the first space binding information as the first indication information, and otherwise perform time binding on the first space binding information, so as to obtain first time binding information, and using the first time binding information as the first indication information,

15 if the number of the second space binding information bits is not greater than the first preset threshold value, using the second space binding information as the second indication information, and otherwise performing time binding on the second space binding information, so as to obtain second time binding information, and using the second time binding information as the second indication information.

20 4. The method according to claim 2 or 3, wherein the first preset threshold value is 2.

5. The method according to any one of claims 1 to 4, wherein the sending mapping information of the first indication information and the second indication information in the uplink subframe comprises:

25 sending the mapping information of the first indication information and the second indication information in the uplink subframe based on a channel selection mapping table;

or,

sending the mapping information of the first indication information and the second indication information in the uplink subframe based on physical uplink shared channel format 3.

6. The method according to any one of claims 1 to 4, wherein,

30 sending mapping information of the first indication information and the second indication information in the uplink subframe by adopting a feedback information channel implicitly assigned to each downlink subframe in a physical downlink control channel;

or,

sending mapping information of the first indication information and the second indication

information in the uplink subframe by adopting a feedback information channel indicated by a feedback information resource indicator in a physical downlink control channel.

7. A method for implementing hybrid automatic repeat request, comprising:

receiving mapping information of first indication information and second indication
5 information sent by a user equipment in a same uplink subframe of a primary cell, wherein the first indication information is used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe, and the second indication information is used to indicate second feedback information of each downlink subframe of a secondary cell that needs to be sent in the uplink subframe;

10 determining the first indication information and the second indication information according to the mapping information, and

determining the first feedback information according to the first indication information, and
determining the second feedback information according to the second indication information,
wherein an uplink and downlink configuration adopted by the primary cell is different from that
15 adopted by the secondary cell.

8. The method according to claim 7, wherein,

the determining the first feedback information according to the first indication information
comprises:

when the number of first feedback information bits is not greater than a first preset threshold
20 value, using the first indication information as a first feedback information, or when the number of first feedback information bits is less than the first preset threshold value, removing filled information from the first indication information to determine the first feedback information; and

when the number of the first feedback information bits is greater than the first preset threshold
value, performing a reverse operation of time binding and/or reverse operation of space binding on
25 the first indication information to determine the first feedback information; and

the determining the second feedback information according to the second indication
information comprises:

when the number of second feedback information bits is not greater than the first preset
threshold value, using the second indication information as the second feedback information, or
30 when the number of the first space binding information bits is less than the first preset threshold value, removing filled information from the first indication information to determine the second feedback information; and

when the number of the second feedback information bits is greater than the first preset
threshold value, performing the reverse operation of time binding and/or reverse operation of space

binding on the second indication information to determine the second feedback information.

9. The method according to claim 7, wherein the determining the first feedback information according to the first indication information, determining the second feedback information according to the second indication information comprises:

5 when the sum of the number of the first feedback information bits and the number of the second feedback information bits is not greater than a second preset threshold value, using the first indication information as the first feedback information, and using the second indication information as the second feedback information, wherein the second preset threshold value is twice as large as the first preset threshold value; and

10 when the sum of the number of the first indication information bits and the number of the second indication information bits is greater than the second preset threshold value, performing a reverse operation of space binding and/or reverse operation of time binding on the first indication information to determine the first feedback information, and performing the reverse operation of space binding and/or reverse operation of time binding on the second indication information to
15 determine the second feedback information.

10. The method according to any one of claims 7 to 9, wherein the determining the first indication information and the second indication information according to the mapping information comprises:

determining the first indication information and the second indication information according to
20 the mapping information based on a channel selection mapping table; and

determining the first indication information and the second indication information according to the mapping information based on physical uplink shared channel format 3.

11. A user equipment, comprising:

a processor, configured to determine first indication information and second indication
25 information according to feedback information of each downlink subframe of a primary cell and that of a secondary cell that need to be sent in a same uplink subframe of the primary cell, separately, wherein the first indication information is used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe, and the second indication information is used to indicate second feedback information of each downlink
30 subframe of the secondary cell that needs to be sent in the uplink subframe; and

a sender, configured to send mapping information of the first indication information and the second indication information in the uplink subframe, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

12. The user equipment according to claim 11, wherein,

the processor is configured to: when the number of first feedback information bits is not greater than a first preset threshold value, use the first feedback information as the first indication information, or when the number of first feedback information bits is less than a first preset threshold value, perform filling on the first feedback information, so that the number of the feedback information bits after filling equals the first preset threshold value, and use the feedback information after filling as the first indication information;

the processor is configured to: when the number of the first feedback information bits is greater than the first preset threshold value, perform space binding on the first feedback information, so as to obtain first space binding information, when the number of the first space binding information bits is not greater than the first preset threshold value, use the first space binding information as the first indication information, or when the number of the first space binding information bits is less than the first preset threshold value, perform filling on the first space binding information, so that the number of the first space binding information bits after filling equals the first preset threshold value, and use the first space binding information after filling as the first indication information; and when the number of the first space binding information bits is greater than the first preset threshold value, perform time binding on the first space binding information, so as to obtain first time binding information, and use the first time binding information as the first indication information;

the processor is configured to: when the number of second feedback information bits is not greater than the first preset threshold value, use the second feedback information as the second indication information, or when the number of second feedback information bits is less than the first preset threshold value, perform filling on the second feedback information, so that the number of the feedback information bits after filling equals the first preset threshold value, and use the feedback information after filling as the second indication information; and

the processor is configured to: when the number of the second feedback information bits is greater than the first preset threshold value, perform space binding on the second feedback information, so as to obtain second space binding information, when the number of the second space binding information bits is not greater than the first preset threshold value, use the second space binding information as the second indication information, or when the number of the second space binding information bits is less than the first preset threshold value, perform filling on the second space binding information, so that the number of the second space binding information bits after filling equals the first preset threshold value, and use the second space binding information after filling as the second indication information; and when the number of the second space binding information bits is greater than the first preset threshold value, perform time binding on the second

space binding information, so as to obtain second time binding information, and use the second time binding information as the second indication information.

13. The user equipment according to claim 11, wherein,

the processor is configured to: when the sum of the number of the first feedback information bits and the number of the second feedback information bits is not greater than a second preset threshold value, use the first feedback information as the first indication information, and use the second feedback information as the second indication information, wherein the second preset threshold value is twice as large as the first preset threshold value; and

the processor is configured to: when the sum of the number of the first feedback information bits and the number of the second feedback information bits is greater than the second preset threshold value, perform space binding on the first feedback information to obtain first space binding information, and perform space binding on the second feedback information to obtain second space binding information, wherein the second preset threshold value is twice as large as the first preset threshold value; when the sum of the number of the first space binding information bits and the number of the second space binding information bits is not greater than the second preset threshold value, use the first space binding information as the first indication information, and use the second space binding information as the second indication information; when the sum of the number of the first space binding information bits and the number of the second space binding information bits is greater than the second preset threshold value, if the number of the first space binding information bits is not greater than the first preset threshold value, use the first space binding information as the first indication information, and otherwise perform time binding on the first space binding information, so as to obtain first time binding information, and use the first time binding information as the first indication information; if the number of the second space binding information bits is not greater than the first preset threshold value, use the second space binding information as the second indication information, and otherwise perform time binding on the second space binding information, so as to obtain second time binding information, and use the second time binding information as the second indication information.

14. A base station, comprising:

a receiver, configured to receive mapping information of first indication information and second indication information sent by a user equipment in a same uplink subframe of a primary cell, wherein the first indication information is used to indicate first feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe, and the second indication information is used to indicate second feedback information of each downlink subframe of a secondary cell that needs to be sent in the uplink subframe; and

a processor, configured to determine the first indication information and the second indication information according to the mapping information, determine the first feedback information according to the first indication information, and determine the second feedback information according to the second indication information, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

15. The base station according to claim 14, wherein the processor is configured to: when the number of first feedback information bits is not greater than a first preset threshold value, use the first indication information as the first feedback information, or when the number of first feedback information bits is less than a first preset threshold value, remove filled information from the first indication information to determine the first feedback information;

the processor is configured to: when the number of the first feedback information bits is greater than the first preset threshold value, perform a reverse operation of time binding and/or reverse operation of space binding on the first indication information to determine the first feedback information;

the processor is configured to: when the number of second feedback information bits is not greater than the first preset threshold value, use the second indication information as the second feedback information, or when the number of second feedback information bits is less than the first preset threshold value, remove filled information from the first indication information to determine the second feedback information; and

the processor is configured to: when the number of the second feedback information bits is greater than the first preset threshold value, perform the reverse operation of time binding and/or reverse operation of space binding on the second indication information to determine the second feedback information.

16. The base station according to claim 14, wherein,

the processor is configured to: when the sum of the number of the first feedback information bits and the number of the second feedback information bits is not greater than a second preset threshold value, use the first indication information as the first feedback information, and use the second indication information as the second feedback information, wherein the second preset threshold value is twice as large as the first preset threshold value; and

the processor is configured to: when the sum of the number of the first indication information bits and the number of the second indication information bits is greater than the second preset threshold value, perform a reverse operation of space binding and/or reverse operation of time binding on the first indication information to determine the first feedback information, and perform the reverse operation of space binding and/or reverse operation of time binding on the second

indication information to determine the second feedback information.

17. A method for implementing hybrid automatic repeat request, comprising:

performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell, so that the primary cell and the secondary cell both have feedback information corresponding to a first number of downlink subframes to send in the uplink subframe;

determining first indication information used to indicate feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe and second indication information used to indicate feedback information of each downlink subframe of the secondary cell that needs to be sent in the uplink subframe according to the feedback information corresponding to the first number of downlink subframes of the primary cell and the secondary cell;

sending mapping information of the first indication information and the second indication information in the uplink subframe, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

18. The method according to claim 17, wherein the first number equals the maximum value of the number of downlink subframes of the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

19. The method according to claim 18, wherein,

when a set of the downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe is a set K1, a set of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe is a set K2, and the set K1 is a subset of the set K2,

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

setting the feedback information of the subframes that belong to the set K2 and do not belong to the set K1 in the primary cell to discontinuous transmission information;

when a set of the downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe is a set K1, a set of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe is a set K2, and the set K1 is a subset of the set K2,

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

setting the feedback information of the subframes that belong to the set K2 and do not belong to the set K1 in the secondary cell to discontinuous transmission information.

20. The method according to claim 17, wherein the first number is the size of a binding window in a configured timing relationship of feedback information, the first number is greater than the number of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe, and the first number is greater than the number of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe, and

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

performing filling on feedback information for the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

21. The method according to any one of claims 17 to 20, wherein the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

sorting the feedback information of the cell in the primary cell and the secondary cell whose feedback information is to be filled;

when the first feedback information in the feedback information of the cell whose feedback information is to be filled is acknowledgment information, filling a piece of acknowledgment information before the first feedback information, so as to obtain feedback information after filling, or,

when the first feedback information is negative acknowledgment information or discontinuous transmission information, filling a piece of discontinuous transmission information before the first feedback information, so as to obtain feedback information after filling.

22. The method according to claim 21, wherein,

when a semi-statically scheduled service exists, a feedback information channel indicated by a physical control channel whose downlink assignment index equals 1 is used as the first feedback information channel for sending the feedback information after filling, and the feedback information channel of semi-statically scheduling is used as the second feedback information channel for sending the feedback information after filling; or

when a semi-statically scheduling service does not exist, a feedback information channel indicated by a physical control channel whose downlink assignment index equals 2 is used as the first feedback information channel for sending the feedback information after filling, and a feedback information channel indicated by a physical control channel whose downlink assignment index

equals 1 is used as the second feedback information channel for sending the feedback information after filling.

23. The method according to any one of claims 17 to 22, wherein,
the sending mapping information of the first indication information and the second indication
5 information in the uplink subframe comprises:

sending the mapping information of the first indication information and the second indication
information in the uplink subframe based on a channel selection mapping table; or,

sending the mapping information of the first indication information and the second indication
information in the uplink subframe based on physical uplink shared channel format 3.

24. A method for implementing hybrid automatic repeat request, comprising:

receiving mapping information of first indication information and second indication
information in a same uplink subframe of a primary cell;

determining the first indication information and the second indication information according to
the mapping information;

determining feedback information corresponding to a first number of downlink subframes of
the primary cell according to the first indication information, and determining feedback information
corresponding to the first number of downlink subframes of a secondary cell according to the
second indication information; and

removing filled information from the feedback information corresponding to the first number
of downlink subframes of the primary cell according to the bit number of the feedback information
of the primary cell that needs to be sent in the uplink subframe and the first number, so as to
determine the feedback information of the primary cell that needs to be sent in the uplink subframe,
and/or removing filled information from the feedback information corresponding to the first number
of downlink subframes of the secondary cell according to the bit number of the feedback
information of the secondary cell that needs to be sent in the uplink subframe and the first number,
so as to determine the feedback information of the secondary cell that needs to be sent in the uplink
subframe.

25. The method according to claim 24, wherein the first number equals the maximum value of
the number of downlink subframes of the primary cell and the secondary cell whose feedback
information needs to be sent in the uplink subframe.

26. The method according to claim 25, wherein the first number is the size of a binding
window in a configured timing relationship of feedback information, the first number is greater than
the number of downlink subframes of the primary cell whose feedback information needs to be sent
in the uplink subframe, and the first number is greater than the number of downlink subframes of

the secondary cell whose feedback information needs to be sent in the uplink subframe.

27. The method according to any one of claims 24 to 26, wherein,

the determining the first indication information and the second indication information according to the mapping information comprises:

5 determining the first indication information and the second indication information according to the mapping information based on a channel selection mapping table;

or,

determining the first indication information and the second indication information according to the mapping information based on physical uplink shared channel format 3.

10 28. A user equipment, comprising:

a processor, configured to perform filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell, so that the primary cell and the secondary cell both have feedback information corresponding to a first number of downlink subframes to send in the uplink subframe; and
15 configured to determine first indication information used to indicate feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe and second indication information used to indicate feedback information of each downlink subframe of the secondary cell that needs to be sent in the uplink subframe according to the feedback information corresponding to the first number of downlink subframes of the primary cell and the secondary cell;

20 and

a sender, configured to send mapping information of the first indication information and the second indication information in the uplink subframe, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

25 29. The user equipment according to claim 28, wherein the first number equals the maximum value of the number of downlink subframes of the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

30 30. The user equipment according to claim 28, wherein the first number is the size of a binding window in a configured timing relationship of feedback information, the first number is greater than the number of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe, the first number is greater than the number of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe, and the processor is configured to perform filling on feedback information for the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

31. A base station, comprising:

a receiver, configured to receive mapping information of first indication information and second indication information in a same uplink subframe of a primary cell; and

a processor, configured to determine the first indication information and the second indication information according to the mapping information; determine feedback information corresponding to a first number of downlink subframes of the primary cell according to the first indication information, determine feedback information corresponding to the first number of downlink subframes of a secondary cell according to the second indication information, remove filled information from the feedback information corresponding to the first number of downlink subframes of the primary cell according to the bit number of the feedback information of the primary cell that needs to be sent in the uplink subframe and the first number, so as to determine the feedback information of the primary cell that needs to be sent in the uplink subframe, and/or remove filled information from the feedback information corresponding to the first number of downlink subframes of the secondary cell according to the bit number of the feedback information of the secondary cell that needs to be sent in the uplink subframe and the first number, so as to determine the feedback information of the secondary cell that needs to be sent in the uplink subframe.

32. The base station according to claim 31, wherein the first number equals the maximum value of the number of downlink subframes of the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

33. The base station according to claim 31, wherein the first number is the size of a binding window in the configured timing relationship of feedback information, the first number is greater than the number of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe, and the first number is greater than the number of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe.

34. A communications system, comprising:

the user equipment of any one of claims 11 to 13 and the base station of any one of claims 14 to 16;

or,

the user equipment of any one of claims 28 to 30 and the base station of any one of claims 31 to 33.

35. A readable medium, comprising: computer readable instructions executing, when being run, the following operations:

performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell, so that the

primary cell and the secondary cell both have feedback information corresponding to a first number of downlink subframes to send in the uplink subframe;

determine first indication information used to indicate feedback information of each downlink subframe of the primary cell that needs to be sent in the uplink subframe and second indication information used to indicate feedback information of each downlink subframe of the secondary cell that needs to be sent in the uplink subframe according to the feedback information corresponding to the first number of downlink subframes of the primary cell and the secondary cell; and

sending mapping information of the first indication information and the second indication information in the uplink subframe, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell.

36. The readable medium according to claim 35, wherein the first number equals the maximum value of the number of downlink subframes of the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

37. The readable medium according to claim 36, wherein, when a set of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe is a set K1, a set of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe is a set K2, and the set K1 is a subset of the set K2,

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

setting the feedback information of the subframes that belong to the set K2 and do not belong to the set K1 in the primary cell to discontinuous transmission information;

when a set of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe is a set K1, a set of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe is a set K2, and the set K1 is a subset of the set K2,

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

setting the feedback information of the subframes that belong to the set K2 and do not belong to the set K1 in the secondary cell to discontinuous transmission information.

38. The readable medium according to claim 35, wherein the first number is the size of a binding window in a configured timing relationship of feedback information, the first number is

greater than the number of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe, the first number is greater than the number of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe, and

the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

performing filling on feedback information for the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

39. The readable medium according to any one of claims 35 to 38, wherein the performing filling on feedback information for a primary cell and/or a secondary cell whose feedback information needs to be sent in a same uplink subframe of the primary cell comprises:

sequencing the feedback information of the cell to perform filling on feedback information in the primary cell and the secondary cell; and

when the first feedback information in the feedback information of the cell to perform filling on feedback information is acknowledgment information, filling a piece of acknowledgment information before the first feedback information, so as to obtain filled feedback information, or,

when the first feedback information is negative acknowledgment information or discontinuous transmission information, filling a piece of discontinuous transmission information before the first feedback information, so as to obtain filled feedback information.

40. The readable medium according to claim 39, wherein,

when a semi-statically scheduled service exists, a feedback information channel indicated by a physical control channel whose downlink assignment index equals 1 is used as the first feedback information channel for sending the feedback information after filling, and a feedback information channel of semi-statically scheduled is used as the second feedback information channel for sending the feedback information after filling; and

when a semi-statically scheduled service does not exist, a feedback information channel indicated by a physical control channel whose downlink assignment index equals 2 is used as the first feedback information channel for sending the feedback information after filling, and a feedback information channel indicated by a physical control channel whose downlink assignment index equals 1 is used as the second feedback information channel for sending the feedback information after filling.

41. The readable medium according to any one of claims 35 to 40, wherein,

the sending mapping information of the first indication information and the second indication

information in the uplink subframe comprises:

sending the mapping information of the first indication information and the second indication information in the uplink subframe based on a channel selection mapping table; or,

5 sending the mapping information of the first indication information and the second indication information in the uplink subframe based on physical uplink shared channel format 3.

42. A readable medium, comprising: computer readable instructions executing, when being run, the following operations:

receiving mapping information of first indication information and second indication information in a same uplink subframe of a primary cell;

10 determining the first indication information and the second indication information according to the mapping information;

determining feedback information corresponding to a first number of downlink subframes of the primary cell according to the first indication information, and determining feedback information corresponding to the first number of downlink subframes of a secondary cell according to the
15 second indication information; and

removing filled information from the feedback information corresponding to the first number of downlink subframes of the primary cell according to the bit number of the feedback information of the primary cell that needs to be sent in the uplink subframe and the first number, so as to determine the feedback information of the primary cell that needs to be sent in the uplink subframe,
20 and/or removing filled information from the feedback information corresponding to the first number of downlink subframes of the secondary cell according to the bit number of the feedback information of the secondary cell that needs to be sent in the uplink subframe and the first number, so as to determine the feedback information of the secondary cell that needs to be sent in the uplink subframe.

25 43. The readable medium according to claim 42, wherein the first number equals the maximum value of the number of downlink subframes of the primary cell and the secondary cell whose feedback information needs to be sent in the uplink subframe.

44. The readable medium according to claim 43, wherein the first number is the size of a binding window in a configured timing relationship of feedback information, the first number is
30 greater than the number of downlink subframes of the primary cell whose feedback information needs to be sent in the uplink subframe, and the first number is greater than the number of downlink subframes of the secondary cell whose feedback information needs to be sent in the uplink subframe.

45. The method according to any one of claims 42 to 44, wherein,

the determining the first indication information and the second indication information according to the mapping information comprises:

determining the first indication information and the second indication information according to the mapping information based on a channel selection mapping table; and

5 or,

determining the first indication information and the second indication information according to the mapping information based on physical uplink shared channel format 3.

CLAIMS

1. A method for implementing hybrid automatic repeat request, comprising:
receiving downlink information in M1 downlink subframes of a primary cell and generating
M1 feedback information(810);

5 receiving downlink information in M2 downlink subframes of a secondary cell and
generating M2 feedback information, wherein an uplink and downlink configuration adopted by the
primary cell is different from that adopted by the secondary cell (810);

determining the maximum value M of M1 and M2 (820);

if M2 is less than M, setting M-M2 DTX for the secondary cell (830);

10 if M1 is less than M, setting M-M1 DTX for the primary cell (830);

sending M feedback information of the primary cell and M feedback information of the
secondary cell in a foregoing uplink subframe of the primary cell (840).

2. The method according to claim 1, wherein sending M feedback information of the
15 primary cell and M feedback information of the secondary cell in a foregoing uplink subframe of
the primary cell (840), comprising:

sending M feedback information of the primary cell and M feedback information of the
secondary cell in a foregoing uplink subframe of the primary cell according to a channel selection
mapping table that is in LTE release 10 and used to process a binding window with the size being
20 the M (840).

3. The method according to claim 1 or 2, wherein M1 is an integer greater than zero, M2 is
an integer greater than zero.

25 4. A user equipment, comprising:

a processor (1110), configured to receive downlink information in M1 downlink subframes
of a primary cell and generate M1 feedback information; receive downlink information in M2
downlink subframes of a secondary cell and generating M2 feedback information, wherein an
uplink and downlink configuration adopted by the primary cell is different from that adopted by the
secondary cell; determining the maximum value M of M1 and M2; if M2 is less than M, setting
30 M-M2 DTX for the secondary cell; if M1 is less than M, setting M-M1 DTX for the primary cell;

a sender (1120), configured to send M feedback information of the primary cell and M

feedback information of the secondary cell in a foregoing uplink subframe of the primary cell.

5 5. The user equipment according to claim 4, wherein the sender (1120) further configured to send M feedback information of the primary cell and M feedback information of the secondary cell in a foregoing uplink subframe of the primary cell according to a channel selection mapping table that is in LTE release 10 and used to process a binding window with the size being the M.

10 6. The user equipment according to claim 4 or 5, wherein M1 is an integer greater than zero, M2 is an integer greater than zero.

15 7. A non-transitory computer readable medium, comprising: computer readable instructions executing, when being run, the following operations:

receiving downlink information in M1 downlink subframes of a primary cell and generating M1 feedback information;

20 receiving downlink information in M2 downlink subframes of a secondary cell and generating M2 feedback information, wherein an uplink and downlink configuration adopted by the primary cell is different from that adopted by the secondary cell;

determining the maximum value M of M1 and M2;

if M2 is less than M, setting M-M2 DTX for the secondary cell;

25 if M1 is less than M, setting M-M1 DTX for the primary cell;

sending M feedback information of the primary cell and M feedback information of the secondary cell in a foregoing uplink subframe of the primary cell.

30 8. The non-transitory computer readable medium according to claim 7, wherein sending M feedback information of the primary cell and M feedback information of the secondary cell in a foregoing uplink subframe of the primary cell, comprising:

sending M feedback information of the primary cell and M feedback information of the secondary cell in a foregoing uplink subframe of the primary cell according to a channel selection mapping table that is in LTE release 10 and used to process a binding window with the size being the M.

35 9. The non-transitory computer readable medium according to claim 7 or 8, wherein M1 is an integer greater than zero, M2 is an integer greater than zero.