

What is claimed is:

1. A method for transmitting control information, the method comprising:

~~determining at least two cyclic shift values of an uplink control channel sequence~~
~~a cyclic shift value according to a configuration of the an uplink control channel sequence by using a modulo operation; wherein the cyclic shift value is one of at least two cyclic shift values of the uplink control channel sequence and wherein the configuration of the uplink control channel sequence comprises at least one of an initial cyclic shift value, a cyclic shift difference value, or a quantity of cyclic shift values, and wherein the configuration of the uplink control channel sequence further comprises a hopping parameter; and~~

~~receiving uplink control information (UCI) from a terminal device according to at least one of the at least two cyclic shift values~~
~~the determined cyclic shift value,~~

~~wherein the determining the at least two cyclic shift values of the uplink control channel sequence according to the configuration of the uplink control channel sequence by using the modulo operation comprises:~~

~~determining an i^{th} cyclic shift value $\Phi(i)$ of the at least two cyclic shift values according to the following formula:~~

$$\Phi(i) = (\alpha + i * \delta + h) \bmod N$$

~~wherein α , i , δ , and N are all integers, α represents the initial cyclic shift value, δ represents the cyclic shift difference value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter or the function of the hopping parameter, $0 \leq \alpha \leq N$, $0 \leq i < N$, $0 < \delta < N$, and $0 \leq h < N$.~~

2. The method of claim 1, wherein ~~after determining a configuration of an uplink control channel sequence of a terminal device,~~ the method further comprises:

sending at least one of the initial cyclic shift value, the cyclic shift difference value, or the quantity of cyclic shift values to the terminal device.

3. The method of claim 1 or 2, wherein ~~determining the cyclic shift value according to the configuration of the uplink control channel sequence comprises:~~

~~determining the cyclic shift value according to the configuration of the uplink control channel sequence by using a modulo operation.~~

4. The method of claim 3, wherein the configuration of the uplink control channel sequence further comprises a hopping parameter.

5. The method of claim 4 wherein the UCI comprise ACK/NACK information and when 1 bit of the ACK/NACK information is needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise two cyclic shift values, wherein:

a 0th cyclic shift value is $\phi(0) = (\alpha + 0 + h) \bmod N$;

a 1st cyclic shift value is $\phi(1) = (\alpha + 6 + h) \bmod N$; and

α and N are integers, α represents the initial cyclic shift value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, and $0 \leq h < N$.

6. The method of claim 4 wherein the UCI comprises ACK/NACK information and when 2 bits are used by the terminal device to feed back the ACK/NACK information, the at least two cyclic shift values of the uplink control channel sequence comprise four cyclic shift values, wherein:

a 0th cyclic shift value is $\phi(0) = (\alpha + 0 + h) \bmod N$;

a 1st cyclic shift value is $\phi(1) = (\alpha + 3 + h) \bmod N$;

a 2nd cyclic shift value is $\phi(2) = (\alpha + 6 + h) \bmod N$;

a 3rd cyclic shift value is $\phi(3) = (\alpha + 9 + h) \bmod N$; and

α and N are integers, α represents the initial cyclic shift value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, and $0 \leq h < N$.

7. The method of claim 4, wherein the determining the cyclic shift value according to the configuration of the uplink control channel sequence by using the modulo operation comprises:

determining an i^{th} cyclic shift value $\phi(i)$ of the at least two cyclic shift values according to the following formula:

$$\phi(i) = (\alpha + i * \delta + h) \bmod N$$

wherein α , i , δ , and N are all integers, α represents the initial cyclic shift value, δ represents the cyclic shift difference value, N represents a quantity of cyclic shifts that can be applied to

~~the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, $0 \leq i < N$, $0 < \delta < N$, and $0 \leq h < N$.~~

38. The method of claim 7-1, wherein the UCI comprises ACK/NACK information and when 1 bit of the ACK/NACK information is needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise two cyclic shift values, where " i " is 0 or 1 and " δ " = 6.

94. The method of claim 7-1, wherein the UCI comprise ACK/NACK information and when 2 bits of the ACK/NACK information are needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise four cyclic shift values, where " i " is 0, 1, 2 or 3 and " δ " = 3.

405. A method for transmitting control information by a terminal device, the method comprising:

determining a configuration of an uplink control channel sequence, wherein the configuration of the uplink control channel sequence comprises at least one of an initial cyclic shift value, a cyclic shift difference value, or a quantity of cyclic shift values, and wherein the configuration of the uplink control channel sequence further comprises a hopping parameter;

determining at least two cyclic shift values of the uplink control channel sequence according to the configuration of the uplink control channel sequence by using a modulo operation; and

sending uplink control information (UCI) to a network device by using at least one of the cyclic shift values;

wherein determining at least two cyclic shift values of the uplink control channel sequence according to the configuration of the uplink control channel sequence comprises:

determining an i^{th} cyclic shift value $\Phi(i)$ of the at least two cyclic shift values according to the following formula:

$$\Phi(i) = (\alpha + i * \delta + h) \bmod N,$$

wherein α , i , δ , and N are all integers, α represents the initial cyclic shift value, δ represents the cyclic shift difference value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter or the function of the hopping parameter, $0 \leq \alpha \leq N$, $0 \leq i < N$, $0 < \delta < N$, and $0 \leq h < N$.

146. The method of claim 105, wherein determining a configuration of an uplink control channel sequence comprises:

receiving the configuration of the uplink control channel sequence sent by the network device.

~~12. The method according to claim 10 or 11, wherein determining at least two cyclic shift values of the uplink control channel sequence according to the configuration of the uplink control channel sequence comprises:~~

~~determining the at least two cyclic shift values according to the configuration of the uplink control channel sequence by using a modulo operation.~~

~~13. The method of claim 12, wherein the configuration of the uplink control channel sequence further comprises a hopping parameter.~~

~~14. The method of claim 13, wherein the UCI comprise ACK/NACK information and when 1 bit of the ACK/NACK information is needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise two cyclic shift values, wherein:~~

~~a 0th cyclic shift value is $\phi(0) = (\alpha + 0 + h) \bmod N$;~~

~~a 1st cyclic shift value is $\phi(1) = (\alpha + 6 + h) \bmod N$; and~~

~~α and N are integers, α represents the initial cyclic shift value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, and $0 \leq h < N$.~~

~~15. The method of claim 13, wherein the UCI comprises ACK/NACK information and when 2 bits are used by the terminal device to feed back the ACK/NACK information, the at least two cyclic shift values of the uplink control channel sequence comprise four cyclic shift values, wherein:~~

~~a 0th cyclic shift value is $\phi(0) = (\alpha + 0 + h) \bmod N$;~~

~~a 1st cyclic shift value is $\phi(1) = (\alpha + 3 + h) \bmod N$;~~

~~a 2nd cyclic shift value is $\phi(2) = (\alpha + 6 + h) \bmod N$;~~

~~a 3rd cyclic shift value is $\phi(3) = (\alpha + 9 + h) \bmod N$; and~~

~~α and N are integers, α represents the initial cyclic shift value, N represents a quantity of~~

cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, and $0 \leq h \leq N$.

~~16. The method of claim 13, wherein determining at least two cyclic shift values of the uplink control channel sequence according to the configuration of the uplink control channel sequence comprises:~~

~~determining an i^{th} cyclic shift value $\Phi(i)$ of the at least two cyclic shift values according to the following formula:~~

$$\Phi(i) = (\alpha + i * \delta + h) \bmod N,$$

~~wherein α , i , δ , and N are all integers, α represents the initial cyclic shift value, δ represents the cyclic shift difference value, N represents a quantity of cyclic shifts that can be applied to the uplink control channel sequence, h represents a hopping count determined according to the hopping parameter, $0 \leq \alpha \leq N$, $0 \leq i \leq N$, $0 \leq \delta \leq N$, and $0 \leq h \leq N$.~~

~~147. The method of claim 165, wherein the UCI comprises ACK/NACK information and when 1 bit of the ACK/NACK information is needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise two cyclic shift values, where " i " is 0 or 1 and " δ " = 6.~~

~~188. The method of claim 165, wherein the UCI comprise ACK/NACK information and when 2 bits of the ACK/NACK information are needed to be fed back by the terminal device, the at least two cyclic shift values of the uplink control channel sequence comprise four cyclic shift values, where " i " is 0, 1, 2 or 3 and " δ " = 3.~~

~~199. A network device adapted to perform steps of the method according to any one of claims 1 to 94.~~

~~2010. A terminal device adapted to perform steps of the method according to any one of claims 105 to 188.~~