CLAIMS

1. A method for determining an index of an orthogonal basis vector, applied to a network device, wherein the method comprises:

receiving, from a terminal, position information, wherein the position information in an orthogonal basis matrix~~is associated with an orthogonal basis vector~~; and

determining at least one first index set based on the position information, wherein the first index set represents a set of column indices of a plurality of orthogonal basis vectors in an orthogonal basis matrix;~~.~~

the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.

~~2. The method according to claim 1, wherein~~

~~the position information comprises at least one start index, and the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix;~~

~~or~~

~~the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.~~

~~3~~2. The method according to claim ~~2~~1, wherein

the first index set is associated with one or more of the start index, the second index set, an oversampling factor, an index of a layer, a row number index of a transform domain matrix, and an oversampling offset coefficient of the orthogonal basis vector, wherein

the oversampling offset coefficient of the orthogonal basis vector is greater than or equal to zero and less than the oversampling factor;~~.~~

wherein the transform domain matrix is obtained by performing a time domain transform for each row of a coefficient matrix or multiplying it by the orthogonal basis matrix and the coefficient matrix is a matrix of orthogonal beam vector combining coefficients.

~~4~~3. The method according to claim ~~1 or 3~~2, further comprising:

performing modulo M with respect to the first index set based on the position information to obtain modulo results, wherein M is the number of columns of the transform domain matrix.

~~5~~4. The method according to claim ~~3 or 4~~2 or 3, wherein the start index is represented by $I^{r}_{n,i}$, and the first index set is represented by $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(X-1)+v}]$; and

$I^{r}_{n,i}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is i; $I^{r}_{n,i+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + v$; $I^{r}_{n,i+O*1+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + O * 1 + v$; and $I^{r}_{n,i+O*(X-1)+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + O * (X - 1) + v$, wherein

O represents the oversampling factor, X represents the number of indices in the first index set, r represents an index of a layer, n represents the row number index of the transform domain matrix, v represents the oversampling offset coefficient of the orthogonal basis vector, and i is an integer greater than or equal to zero.

~~6~~5. The method according to claim ~~5~~4, wherein the performing modulo M with respect to the first index set based on the position information to obtain modulo results comprises at least one of the following:

if the position index $I^{r}_{n,i}$ starts from 0, performing modulo M with respect to particular elements to obtain $[\tilde{I}^{r}_{n,i+v} \quad \tilde{I}^{r}_{n,i+O*1+v} \quad \cdots \quad \tilde{I}^{r}_{n,i+O*(X-1)+v}]$, wherein the

particular elements are indices in $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(X-1)+v}]$ greater than (M–1);

if the position index $I^{r}_{n,i}$ starts from 0, performing modulo M with respect to $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(X-1)+v}]$ to obtain $[\tilde{I}^{r}_{n,i+v} \quad \tilde{I}^{r}_{n,i+O*1+v} \quad \cdots \quad \tilde{I}^{r}_{n,i+O*(X-1)+v}]$;

if the position index $I^{r}_{n,i}$ starts from 1, performing modulo (M+1) with respect to particular elements to obtain $[\tilde{I}^{r}_{n,i+v} \quad \tilde{I}^{r}_{n,i+O*1+v} \quad \cdots \quad \tilde{I}^{r}_{n,i+O*(X-1)+v}]$, wherein the particular elements are indices in $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(X-1)+v}]$ greater than M; and

if the position index $I^{r}_{n,i}$ starts from 1, performing modulo (M+1) with respect to $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(X-1)+v}]$ to obtain $[\tilde{I}^{r}_{n,i+v} \quad \tilde{I}^{r}_{n,i+O*1+v} \quad \cdots \quad \tilde{I}^{r}_{n,i+O*(X-1)+v}]$; wherein

$\tilde{I}^{r}_{n,i+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $(i+v)$ modulo M or $(i+v)$ modulo (M+1); $\tilde{I}^{r}_{n,i+O*1+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $(i+O*1+v)$ modulo M or $(i+O*1+v)$ modulo (M+1); and $\tilde{I}^{r}_{n,i+O*(X-1)+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $(i+O*(X-1)+v)$ modulo M or $(i+O*(X-1)+v)$ modulo (M+1).

~~7~~6. The method according to claim ~~3~~ 2 or 34, wherein the start index is represented by $I^{r}_{n,i}$, the second index set is represented by $[I^{r}_{n,i_0+v} \quad I^{r}_{n,i_1+O*1+v} \quad \cdots \quad I^{r}_{n,i_{X-1}+O*(X-1)+v}]$, and the first index set is represented by $[I^{r}_{n,i_0+v+i} \quad I^{r}_{n,i_1+O*1+v+i} \quad \cdots \quad I^{r}_{n,i_{X-1}+O*(X-1)+v+i}]$; and

$I^{r}_{n,i}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is i; I^{r}_{n,i_0+v} represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is i_0+v; $I^{r}_{n,i_1+O*1+v}$ represents that an index of the n^{th} row of

the transform domain matrix at the r[th] layer is $i_1 + 0 * 1 + v$; and $\mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v}$ represents that an index of the n[th] row of the transform domain matrix at the r[th] layer is $i_{X-1} + 0 * (\mathrm{X} - 1) + v$, wherein

O represents the oversampling factor, X represents the number of indices in the first index set, r represents an index of a layer, n represents the row number index of the transform domain matrix, v represents the oversampling offset coefficient of the orthogonal basis vector, and i is an integer greater than or equal to zero.

78. The method according to claim 67, wherein the performing modulo M with respect to the first index set based on the position information to obtain modulo results comprises at least one of the following:

if the position index $\mathrm{I}^{\mathrm{r}}_{\mathrm{n,i}}$ starts from 0, performing modulo M with respect to particular elements to obtain $[\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$, wherein the particular elements are indices in $[\mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$ greater than (M–1);

if the position index $\mathrm{I}^{\mathrm{r}}_{\mathrm{n,i}}$ starts from 0, performing modulo M with respect to $[\mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+\mathrm{v}+\mathrm{i}}]$ to obtain $[\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+\mathrm{v}+\mathrm{i}}]$;

if the position index $\mathrm{I}^{\mathrm{r}}_{\mathrm{n,i}}$ starts from 1, performing modulo (M+1) with respect to particular elements to obtain $[\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$, wherein the particular elements are indices in $[\mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$ greater than M;

if the position index $\mathrm{I}^{\mathrm{r}}_{\mathrm{n,i}}$ starts from 1, performing modulo (M+1) with respect to $[\mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \mathrm{I}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$ to obtain $[\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}} \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}} \quad \cdots \quad \tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_{X-1}+\mathrm{O}*(\mathrm{X}-1)+v+\mathrm{i}}]$; wherein

$\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_0+v+\mathrm{i}}$ represents that an index of the n[th] row of the transform domain matrix at the r[th] layer is $(i_0 + v + \mathrm{i})$ modulo M or $(i_0 + v + \mathrm{i})$ modulo (M+1); $\tilde{\mathrm{I}}^{\mathrm{r}}_{\mathrm{n},i_1+\mathrm{O}*1+v+\mathrm{i}}$

represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is ($i_1 + 0 * 1 + v + i$) modulo M or ($i_1 + 0 * 1 + v + i$) modulo (M+1); and $\tilde{I}^{r}_{n,i_{X-1}+0*(X-1)+v+i}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $(i_{X-1} + 0 * (X - 1) + v + i)$ modulo M or $(i_{X-1} + 0 * (X - 1) + v + i)$ modulo (M+1).

89. The method according to claim 23, wherein the determining at least one first index set based on the position information comprises at least one of the following:

if the number of start indices is at least one and there is only one value for the row number index n of the transform domain matrix, selecting the first index set with respect to n rows together for each layer;

if the number of start indices is at least two and a value of the row number index n of the transform domain matrix is equal to zero, selecting the first index set with respect to n rows together for each layer;

if the number of start indices is at least two and there are a plurality of values for the row number index n of the transform domain matrix, selecting the first index set with respect to n rows separately for each layer;

if the number of start indices is at least two, there is only one value r for the index of a layer, and there are a plurality of values for the row number index n of the transform domain matrix, selecting the first index set with respect to n rows separately for all layers; and

if the number of start indices is at least two, an index value r of the corresponding layer is equal to zero, and there are a plurality of values for the row number index n of the transform domain matrix, selecting the first index set with respect to n rows separately for all layers;

if the number of start indices is one, there is only one value r for the index of a layer, and there is only one value for the row number index n of the transform domain matrix, selecting the first index set with respect to n rows together for all layers; and

if the number of start indices is one, and both an index value r of the corresponding layer and a value of the row number index n of the transform domain matrix are equal to zero, selecting the first index set with respect to n rows together for all layers.

~~10~~9. The method according to any one of claims ~~3~~ 2 to ~~8~~9, wherein one or more of the oversampling factor, the number of indices in the first index set, and the oversampling offset coefficient of the orthogonal basis vector are configured by a network side or defined by a protocol.

10~~11~~. A method for determining an index of an orthogonal basis vector, applied to a terminal, wherein the method comprises:

determining position information in an orthogonal basis matrix~~, wherein the position information is associated with an orthogonal basis vector~~; and

transmitting the position information to a network device, wherein the position information is for use by the network device to determine at least one first index set, and the first index set represents a set of column indices of a plurality of orthogonal basis vectors in an orthogonal basis matrix;~~.~~

wherein the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.

~~12. The method according to claim 11, wherein the position information comprises at least one start index, and the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix;~~

~~or~~

~~the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.~~

1113. The method according to claim 1210, wherein the first index set is associated with one or more of the start index, the second index set, an oversampling factor, an index of a layer, a row number index of a transform domain matrix, and an oversampling offset coefficient of the orthogonal basis vector, wherein

the oversampling offset coefficient of the orthogonal basis vector is greater than or equal to zero and less than the oversampling factor;

wherein the transform domain matrix is obtained by performing a time domain transform for each row of a coefficient matrix or multiplying it by the orthogonal basis matrix and the coefficient matrix is a matrix of orthogonal beam vector combining coefficients.

1412. The method according to claim 1311, further comprising:

transmitting one or more of the oversampling factor, the number of indices in the first index set, and the oversampling offset coefficient of the orthogonal basis vector to the network device.

1513. The method according to claim 1311, wherein the start index is represented by $I^{r}_{n,i}$, and the first index set is represented by $[I^{r}_{n,i+v} \quad I^{r}_{n,i+O*1+v} \quad \cdots \quad I^{r}_{n,i+O*(x-1)+v}]$; and

$I^{r}_{n,i}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is i; $I^{r}_{n,i+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + v$; $I^{r}_{n,i+O*1+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + O * 1 + v$; and $I^{r}_{n,i+O*(X-1)+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i + O * (X - 1) + v$, wherein

O represents the oversampling factor, X represents the number of indices in the first index set, r represents an index of a layer, n represents the row number index of the transform domain matrix, v represents the oversampling offset coefficient of the orthogonal basis vector, and i is an integer greater than or equal to zero.

1614. The method according to claim 1311, wherein the start index is represented by $I^{r}_{n,i}$, the second index set is represented by

$[I^{r}_{n,i_0+v} \quad I^{r}_{n,i_1+O*1+v} \quad \cdots \quad I^{r}_{n,i_{X-1}+O*(X-1)+v}]$, and the first index set is represented by $[I^{r}_{n,i_0+v+i} \quad I^{r}_{n,i_1+O*1+v+i} \quad \cdots \quad I^{r}_{n,i_{X-1}+O*(X-1)+v+i}]$; and

$I^{r}_{n,i}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is i; I^{r}_{n,i_0+v} represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i_0 + v$; $I^{r}_{n,i_1+O*1+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i_1 + O * 1 + v$; and $I^{r}_{n,i_{X-1}+O*(X-1)+v}$ represents that an index of the n^{th} row of the transform domain matrix at the r^{th} layer is $i_{X-1} + O * (X - 1) + v$, wherein

O represents the oversampling factor, X represents the number of indices in the first index set, r represents an index of a layer, n represents the row number index of the transform domain matrix, v represents the oversampling offset coefficient of the orthogonal basis vector, and i is an integer greater than or equal to zero.

~~17~~15. The method according to claim ~~11~~10, wherein the determining position information comprises:

determining a plurality of transform domain matrices;

obtaining a plurality of N×M transform domain value matrices based on the plurality of transform domain matrices, wherein N is the number of rows of a transform domain matrix, and M is the number of columns of the transform domain matrix;

obtaining a sum matrix having a length of M based on the plurality of N×M transform domain value matrices; and

determining the position information based on a position index of a greatest element in the sum matrix having the length of M.

~~18~~16. The method according to claim ~~11~~10, further comprising:

determining the first index set according to the position information, and sorting indices in the first index set in ascending or descending order;

determining a corresponding feedback matrix based on the transform domain matrix and the sorted first index set; and

transmitting the feedback matrix to the network device.

~~19~~17. A network device, comprising:

a receiving module, configured to receive, from a terminal, position information in an orthogonal basis matrix~~, wherein the position information is associated with an orthogonal basis vector~~; and

a first determining module, configured to determine a first index set based on the position information, wherein the first index set represents a set of column indices of a plurality of orthogonal basis vectors in an orthogonal basis matrix;~~.~~

wherein the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.

~~20~~18. A terminal, comprising:

a second determining module, configured to determine position information in an orthogonal basis matrix~~, wherein the position information is associated with an orthogonal basis vector~~; and

a transmitting module, configured to transmit the position information to a network device, wherein the position information is for use by the network device to determine a first index set, and the first index set represents a set of column indices of a plurality of orthogonal basis vectors in an orthogonal basis matrix;

wherein the position information comprises at least one start index and at least one second index set, the start index is a start position index of a column of an orthogonal basis vector in the orthogonal basis matrix, and the second index set is a set of offset position indices of a plurality of orthogonal basis vectors in columns of the orthogonal basis matrix relative to the start index.