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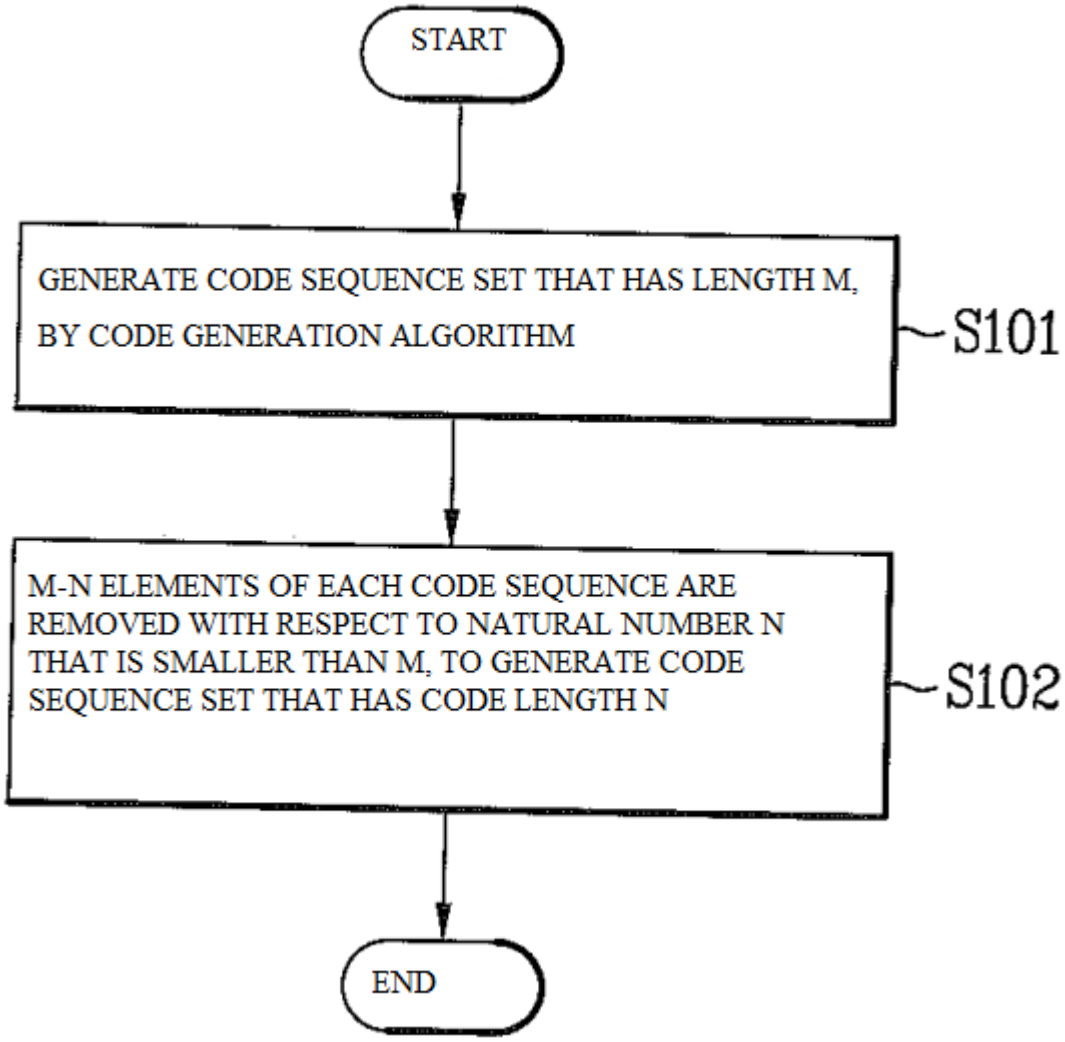
(54) CODE SEQUENCE GENERATION METHOD, SIGNAL TRANSMISSION METHOD, TRANSMISSION DEVICE, CODE SEQUENCE, AND CODE SEQUENCE SET IN COMMUNICATION SYSTEM

(57) Abstract

The present invention relates to a code sequence that is used for initial synchronization acquirement, cell search, channel estimation or the like in a communication system. A code sequence generation method is characterized in that a code sequence generation method used for at least one among initial synchronization acquirement, cell search, and channel estimation in a communication system includes generating a code sequence set having a length of M by a code generation algorithm according to a code type; and adjusting a code length of at least one code sequence belonging to the code sequence set to a natural number N that is smaller than the length M.

Representative drawing

FIG. 1



Claims

1. A signal transmission method in which a transmission side in a communication system data-processes a specific code sequence to a form required by the communication system for at least one among initial synchronization acquirement, cell search, and channel estimation and transmits the processed sequence to a reception side,

wherein the specific code sequence has a natural number N smaller than a number M as a code length due to the removal of some of the elements of a specific code sequence that belong to a code sequence set generated by a code generation algorithm enabling a length to be the number M.

2. The signal transmission method of claim 1, wherein the specific code sequence is data-processed and transmitted to a form of a preamble or pilot signal.

3. The signal transmission method of claim 1, wherein the code is a constant amplitude zero auto-correlation (CAZAC) code sequence

4. The signal transmission method of claim 1, wherein the code is a PN code or Hadamard code.

5. The signal transmission method of claim 3, wherein the code generation algorithm is

$$a^{index(A)}(n) = \begin{cases} \exp\left(i\dfrac{A\pi n(n+1)}{M}\right), & when\ M\ \ is\ odd \\ \exp\left(i\dfrac{A\pi n^2}{M}\right), & when\ M\ \ is\ even \end{cases}$$

$$where\ n = 0,1,2,\cdots,M-1$$

(where a number *A* is relative prime to the number *M*, the numbers *A* and *M* are natural numbers, *index (A) (=0, 1, 2,…,* $N_{seq\ M}$-1*)* means an index when the number *A* is sorted in ascending order).

6. The signal transmission method of claim 3, wherein the number M is a smallest prime number among natural numbers that are larger than the number N.

7. A transmission device that comprises a unit data-processing a specific code sequence to a form required by a communication system to enable the communication system to transmit a signal to a reception side for at least one of initial synchronization acquirement, cell search, and channel estimation, and a unit transmitting the data-processed specific code sequence,

wherein the specific code sequence has a natural number N smaller than a number M as a code length due to the removal of some of the elements of a specific code sequence that belongs to a code sequence set generated by a code generation algorithm enabling a length to be the number M.

8. The transmission device of claim 7, wherein the specific code sequence is data-processed and transmitted to a form of a preamble or pilot signal.

9. The transmission device of claim 7, wherein the code is a CAZAC code sequence.

10. The transmission device of claim 7, wherein the code is a PN code or Hadamard code.

11. The transmission device of claim 9, wherein the code generation algorithm is

$$a^{index(A)}(n)=\begin{cases}\exp\left(i\dfrac{A\pi n(n+1)}{M}\right), & when\ M\ \ is\ odd\\ \exp\left(i\dfrac{A\pi n^2}{M}\right), & when\ M\ \ is\ even\end{cases}$$

$$where\ n=0,1,2,\cdots,M-1$$

(where a number *A* is relative prime to the number *M*, the numbers *A* and *M* are natural numbers, *index (A) (= 0, 1, 2,…,* $N_{seq\ M}$*-1)* means an index when the number *A* is sorted in ascending order).

12. The transmission device of claim 9, wherein the number M is a smallest prime number among natural numbers that are larger than the number N.

13. A code sequence used for at least one among initial synchronization acquirement, cell search, and channel estimation in a communication system, wherein the code sequence has a natural number N smaller than a number M as a code length due to the removal of some of the elements of a specific code sequence that belongs to a code sequence set generated by a code generation algorithm enabling a length to be the number M.

14. The code sequence of claim 13, wherein the code is a CAZAC code sequence.

15. The code sequence of claim 14, wherein the number M is a smallest prime number among natural numbers that are larger than the number N.

16. A code sequence set used for at least one among initial synchronization acquirement, cell search, and channel estimation in a communication system, wherein the code sequence set is made up of code sequences that have a natural number N smaller than a number M as a code length due to the removal of some of the elements of a specific code

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