

Cross-correlation index and multiple-access performance of Gold codes in a spread-spectrum system

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Abstract— Spread-spectrum system is a well-researched topic in literature. However, the system loading capacity with respect to its spreading codes is not well known. In this paper, a technique for determining the loading capacity is developed by the author. The concept of cross-correlation index is first introduced for the codes. Using this concept, a technique for predicting the system loading capacity is then developed for a set of Gold codes. This work involves the proposal of a mathematical model for the cross-correlation index, and the use of the same for the prediction of the loading capacity and system bit-error-rate performance. The model was tested for various set of Gold codes. Results for a set of 255-chip Gold codes are presented here. The results show that the codes have the capacity to support a maximum of about 15 users, above which bit-error-rate increases rapidly, ultimately resulting in emergence of error floor. The point at which the cross-correlation index equals to auto-correlation index marks the turning point around which the system performance revolves.

Keyword— Bit-error-rate, cross-correlation index, error floor, Gold codes, multiple-access performance, Spread-spectrum system.



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