

# New Correlation Bound and Construction of Quasi-Complementary Sequence Sets

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## Abstract

Quasi-complementary sequence sets (QCSSs) have attracted sustained research interests for simultaneously supporting more active users in multi-carrier code-division multiple-access (MC-CDMA) systems compared to complete complementary codes (CCCs). In this paper, we investigate a novel class of QCSSs composed of multiple CCCs. We derive a new aperiodic correlation lower bound for this type of QCSSs, which is tighter than the existing bounds for QCSSs. We then present a systematic construction of such QCSSs with a small alphabet size and low maximum correlation magnitude, and also show that the constructed aperiodic QCSSs can meet the newly derived bound asymptotically.

## Index Terms

Multi-carrier code-division multiple-access (MC-CDMA), aperiodic correlation, complete complementary code (CCC), quasi-complementary sequence set (QCSS), multivariate function.

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