Abstract

This paper proposes to analyze and construct a class of quasi-cyclic (QC) codes for correcting multiple bursts via matrix transformations. The multiple-burst-correction capability of QC codes is studied based on the diagonal structure of their transformed parity-check matrices. By well designing the sub-matrices on the diagonal, the proposed QC codes are able to achieve optimal or asymptotically optimal multiple-burst correction capability. Moreover, the multiple-burst-correction capability of a subclass of QC codes, QC low-density parity-check (QC-LDPC) codes, is further studied. Analysis and simulation results show that our QC-LDPC codes perform well over random channels as well as burst channels.