Design of Optical Orthogonal Codes with Variable Chip Rate for Flexible Optical CDMA Systems

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Abstract – Optical orthogonal codes (OOC’s) have been studied by many researchers to increase its flexibility such as variable code length and variable code weight. Recently, the authors have proposed OOC’s with variable chip rates (VC-VVC), which can keep the orthogonal property of the strict OOC even when different chip rate codes are used in an optical CDMA network for signal multiplexing. In this paper, the VC-OOC’s are reviewed and some approaches of code design using the balanced incomplete block design (BIBD) sequences are proposed. The BIBD parameters suitable for the variable chip rate codes are obtained and discussed.

Keywords – Optical CDMA systems, optical orthogonal codes, variable chip rate, optical access networks