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Constructions of 2-dimensional codes for OCDMA

We present some new families of $(\Lambda \times T, w, \lambda)$ (2-D) wavelength/time optical orthogonal codes (2D-OOCs) with $\lambda = 1, 2$. Such codes are used in optical code-division multiple access (OCDMA) systems for supporting many simultaneous users. All families presented are either optimal with respect to the Johnson bound (J -optimal) or are asymptotically optimal. The constructions are based on certain pointsets in finite projective spaces of dimension k over $GF(q)$ denoted $PG(k, q)$. Exploiting this framework we establish that all 2D-OOCs constructed are in fact maximal (in that no new codeword may be added to the original whereby code cardinality is increased).