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**Bipartite distance-regular graphs and taut pairs of pseudo primitive idempotents.** (English)

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Summary: Let  $\Gamma$  denote a bipartite distance-regular graph with diameter  $D \geq 4$ , valency  $k \geq 3$ , and intersection numbers  $c_i, b_i$  ( $0 \leq i \leq D$ ). By a pseudo cosine sequence of  $\Gamma$  we mean a sequence of complex scalars  $\sigma_0, \sigma_1, \dots, \sigma_D$  such that  $\sigma_0 = 1$  and  $c_i\sigma_{i-1} + b_i\sigma_{i+1} = k\sigma_i$  for  $1 \leq i \leq D-1$ . By an associated pseudo primitive idempotent of  $\Gamma$ , we mean a nonzero scalar multiple of the matrix  $\sum_{i=0}^D \sigma_i A_i$ , where  $A_0, A_1, \dots, A_D$  are the distance matrices of  $\Gamma$ . Given pseudo primitive idempotents  $E, F$  of  $\Gamma$ , we define the pair  $E, F$  to be taut whenever the entry-wise product  $E \circ F$  is not a scalar multiple of a pseudo primitive idempotent, but is a linear combination of two pseudo primitive idempotents of  $\Gamma$ . In this paper, we determine all the taut pairs of pseudo primitive idempotents of  $\Gamma$ .

**MSC:**

**05E30** Association schemes, strongly regular graphs

**05C12** Distance in graphs

**Keywords:**

distance-regular graph; pseudo primitive idempotent; taut pair

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