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THE A-LIKE MATRICES FOR A HYPERCUBE*

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Abstract. Let D denote a positive integer and let Q_D denote the graph of the D-dimensional hypercube. Let X denote the vertex set of Q_D and let $A \in \operatorname{Mat}_X(\mathbb{R})$ denote the adjacency matrix of Q_D . A matrix $B \in \operatorname{Mat}_X(\mathbb{R})$ is called *A*-like whenever both (i) BA = AB; (ii) for all $x, y \in X$ that are not equal or adjacent, the (x, y)-entry of B is zero. Let \mathcal{L} denote the subspace of $\operatorname{Mat}_X(\mathbb{R})$ consisting of the *A*-like elements. The subspace \mathcal{L} is decomposed into the direct sum of its symmetric part and antisymmetric part. A basis for each part is given. The dimensions of the symmetric part and antisymmetric part are D + 1 and $\binom{D}{2}$, respectively.

Key words. A-like matrices, Distance-regular graphs, Hypercubes.

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