

Multiplicative Riesz Decomposition on the Ring of Matrices over a Totally Ordered Field

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The Riesz Decomposition Theorem for lattice ordered groups asserts that for every $a, b_1, \dots, b_n \in G$, with $a \leq b_1 \cdots b_n$ there are $b'_i \leq b_i$ for all $i = 1, \dots, n$ such that $a = b'_1 \cdots b'_n$. We characterize all matrices where this decomposition is possible by solely applying matrix multiplication.