

A survey of LeRoy Beasley's work on matrix rank comparison

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In this talk, we will discuss some of Dr. Beasley's publications defining and comparing various ranks of matrices over semi-rings and their preservers. The \mathcal{S} -factor rank of an $m \times n$ matrix M is the minimum k for which there is an $m \times k$ matrix A and a $k \times n$ matrix B , such that $M = AB$, where the arithmetic is done over \mathcal{S} . The term rank of a matrix M is the smallest number of lines (rows or columns) needed to include all non-zero elements of M . We will survey Beasley's results establishing bounds relating both of the above rank functions on matrices over semi-rings, some generalizing the classical inequalities known for rank functions of matrices over fields. We look at Beasley's work with Tom Laffey comparing nonnegative integer rank and real rank, and at his most recent work comparing isolation number with Boolean rank.

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