ON THE BLOCK STRUCTURE AND FROBENIUS NORMAL FORM OF POWERS OF MATRICES

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Abstract. The Frobenius normal form of a matrix is an important tool in analyzing its properties. When a matrix is powered up, the Frobenius normal form of the original matrix and that of its powers need not be the same. In this article, conditions on a matrix $A$ and the power $q$ are provided so that for any invertible matrix $S$, if $S^{-1} A^q S$ is block upper triangular, then so is $S^{-1} A S$ when partitioned conformably. The result is established for general matrices over any field. It is also observed that the contributions of the index of cyclicity to the spectral properties of a matrix hold over any field. The article concludes by applying the block upper triangular powers result to the cone Frobenius normal form of powers of a eventually cone nonnegative matrix.

Key words. Fields, Frobenius normal form, Block upper triangular matrices, Cones, Eventually nonnegative matrices.

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