On the spectrum and the spectral mapping theorem in max algebra

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We give a new description of spectrum in max algebra of a given non-negative matrix A via local spectral radii and obtain a new block triangular form of A related to its Frobenius normal form. Related results for the usual spectrum of complex matrices and distinguished spectrum for non-negative matrices are also obtained.

As an application we provide a new proof of the spectral mapping theorem in max algebra and also generalize it to the setting of power series in max algebra.

Given a non-negative bounded infinite matrix A, we show that the Bonsall's cone spectral radius of a map $x \mapsto A \otimes x$, with respect to the cone l_+^∞, is included in its max algebra approximate point spectrum. Moreover, the spectral mapping theorem with respect to point and approximate point spectrum in max algebra is investigated. The corresponding results for more general max and max-plus type kernel operators and for tropical Bellman operators are obtained.

This is a joint work with V. MÜLLER (Czech Academy of Sciences).