# Tropical rank and beyond

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Tropical algebra (sometimes called max algebra) is a set of real numbers equipped with the maximum operation instead of usual addition and addition instead of usual multiplication. Under these operations this is an algebraic structure called a semiring. The other typical examples of such structures are non-negative integers, non-negative reals, boolean algebras. Semirings naturally appear in different problems of communication complexity, scheduling theory, optimization, dynamical systems, etc. Semiring arithmetics allows to reduce non-linear problems to the linear problems but over semirings. To investigate these problems it is necessary to develop linear algebra over semirings. This subject is very actual nowdays. Different rank functions over various classes of semirings are intensively investigated during the last decades. We plan to introduce and investigate some of them, in particular, factor rank, tropical rank, nonnegative rank, determinantal rank, Gondran-Minoux rank. We plan to compare these functions and discuss their interrelations. Among the other topics we shall discuss our recent joint research results with Marianne Akian, LeRoy Beasley, Stephane Gaubert, and Yaroslav Shitov.