Positivity: inequalities and preserving transformations
(Org: **Shaun Fallat** (Regina) and/et **Prateek Kumar Vishwakarma** (Laval))

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The Factor Width and Factor Width Rank of a Matrix

The "factor width" of a positive semidefinite matrix is the smallest positive integer k for which it can be written as a sum of positive semidefinite matrices that are each non-zero only in a single k-by-k principal submatrix. We explore numerous problems related to factor width, such as how we can bound it in terms of the matrix's eigenvalues, and we briefly describe some recently-discovered applications of this quantity in quantum information theory.

We also explore the "factor-width-k rank" of a matrix, which is the minimum number of rank-1 matrices that can be used in a matrix's factor-width-at-most-k decomposition. We show that the factor width rank of a banded or arrowhead matrix equals its usual rank, but for other matrices they can differ. We also establish several bounds on the factor width rank of a matrix, including a tight connection between factor-width-k rank and the k-clique covering number of a graph.

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Weighted composition operators on Hilbert function spaces on the ball

A weighted composition operator on a reproducing kernel Hilbert space (RKHS) is given by a composition, followed by a multiplication. We characterize unitary and co-isometric weighted composition operators on large class of RKHS of holomorphic functions on the Euclidean unit ball of $\mathbb{C}^n$. This extends results of Martín, Mas and Vukotić from the disc to the ball. This is joint work with Michael Hartz.

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