

Matrix inequalities and convex functions

Tomaž Kosem, University of Ljubljana, Slovenia

Many matrix inequalities can be derived from scalar inequalities for convex functions. Using the functional calculus scalars can be replaced with Hermitian matrices and appropriate matrix quantities can be compared, e.g. unitarily invariant norms, eigenvalues etc. Also, the Loewner partial order frequently takes place in such inequalities.

Besides some operator versions of Jensen's inequality some results are presented, which are connected with subhomogeneity and subadditivity of concave functions. A generalization of Ando-Zhan inequality between $\|f(A) + f(B)\|$ and $\|f(A+B)\|$ for convex/concave function is shown. Finally, Young's inequality $ab \leq \Phi(a) + \Psi(b)$ and its old and novel matrix interpretations are treated.