

Numerical ranges of real linear operators

Damian Kołaczek

University of Agriculture in Krakow

Real linear operators are continuous additive operators and can be expressed as a sum of linear operator and antilinear operator in a unique way. Here we discuss the concept of numerical range for real linear operators in both Hilbert and Banach space cases and its relation to spectra of such operators. We compare various similarities and differences between numerical radii and numerical ranges in (complex) linear and real linear setting. Our main result is showing that the numerical range of real linear operator on at least two-dimensional complex Hilbert space is always a convex set, which generalize classic Toeplitz-Hausdorff theorem. We also present some new results for the numerical ranges of antilinear operators. The talk is based on recent joint work with Vladimir Müller (Institute of Mathematics, Czech Academy of Sciences).