CONTINUOUS SYMMETRIZATION VIA POLARIZATION

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This is a joint work with F. Brock. We will discuss a one-parameter family of transformations which transforms in a continuous way sets and functions into their (k, n)-Steiner symmetrizations. Our construction consists of two stages. On the first stage we employ a continuous symmetrization introduced in our paper in 1990 to transform sets and functions into their one-dimensional Steiner symmetrization. On this step some of our proofs depend on polarization.

On the second stage we use Blaschke-Sarvas approximation theorem, which says that every k-dimensional Steiner symmetrization with $2 \leq k \leq n$ can be approximated by a sequence of $(k-1)$-dimensional Steiner symmetrizations. Using this result we give an inductive definition of a continuous (k, n)-Steiner symmetrization for any $2 \leq k \leq n$. This transformation gives the desired continuous path along which all basic characteristics of sets and functions change monotonically. The latter leads to continuous versions of several convolution type inequalities and Dirichlet's type inequalities and to continuous versions of comparison theorems for solutions of some elliptic and parabolic equations.