Projection constants of Banach spaces of multivariate polynomials on domains with generic group structures

17 Jun
09:35

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We discuss aspects of an ongoing project with D. Galicer, M. Mansilla, M. Mastyło, and S. Muro.

The *relative projection constant* $\boldsymbol{\lambda}(X, Y)$ of a subspace X of a Banach space Y is defined as the infimum of the norms of all projections from Y onto X. The *absolute projection constant* $\boldsymbol{\lambda}(X)$ is the supremum of the relative projection constants $\boldsymbol{\lambda}(X, Y)$ taken over all Banach spaces Y that contain X as a subspace. The general problem we consider is to develop methods for studying projection constants in Banach spaces of multivariate functions. We outline several abstract ideas that provide a unified framework for treating a wide range of Banach spaces of polynomials—particularly in cases where the domain of the polynomials possesses a natural group structure (this is especially true when the domain is, for example, a compact group). In several concrete settings, we derive explicit estimates and asymptotic behavior for the projection constants of interest.