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Critical Values of Multilinear Forms under Conic Constraints

Let $\Phi : \Pi_{i=1}^{r} E_i \to \mathbb{R}$ be a multilinear form on the Cartesian product of finitely many Euclidean vector spaces. We suppose that each factor E_i is equipped with its own closed convex cone K_i. We analyze the concept of critical point and critical value of Φ when each argument of this function is restricted to a normalization constraint and a conic constraint. Our study encompasses the theory of cone-constrained singular values of bilinear and trilinear forms.

Keywords: Multilinear form, convex cone, variational inequality, complementarity problem, cone-constrained singular value.

MSC: 15A18, 15A23, 90C26, 90C33.