S. Kindermann

Industrial Mathematics Institute, Johannes Kepler University Linz, 4040 Linz, Austria
`kindermann@indmath.uni-linz.ac.at`

A Note on the Approximate Symmetry of Bregman Distances

The Bregman distance $B_{\xi_x}(y, x)$, $\xi_x \in \partial J(y)$, associated to a convex sub-differentiable functional J is known to be in general non-symmetric in its arguments x, y. In this note we address the question when Bregman distances can be bounded against each other when the arguments are switched, i.e., if some constant $C > 0$ exists such that for all x, y on a convex set M it holds that $\frac{1}{C} B_{\xi_x}(y, x) \leq B_{\xi_y}(x, y) \leq C B_{\xi_x}(y, x)$. We state sufficient conditions for such an inequality and prove in particular that it holds for the p-powers of the ℓ_p and L^p-norms when $1 < p < \infty$.

Keywords: Bregman distance, symmetry, strong monotonicity, convexity.

MSC: 52A41, 47H05, 26B25.