

The optimal domain of a Lipschitz map on a metric function space

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Abstract. As in the case of linear operators acting in Banach function lattices, a Lipschitz map can be extended to a subset of metric function space preserving the Lipschitz inequality, that is in a sense the “bigger” function space in which the operator makes sense and the original domain is dense. Concretely, it can be asked to satisfy the maximality condition of being the biggest metric function space to which the operator can be extended preserving the Lipschitz constant. As an application, we show the coarsest metric that can be given for a metric space in which an order bounded lattice-valued-Lipschitz map is defined. Concrete examples involving the relevant space $L^0(\mu)$ are given.