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[Published: 19 July 2023](#)

On the Vietoris semicontinuity property of the L_p balls at $p = 1$ and an application

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[Archiv der Mathematik](#) **121**, 171–182 (2023)

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Abstract

In this paper, the Vietoris right lower semicontinuity at $p = 1$ of the set valued map $p \rightarrow B_{\Omega, \mathcal{X}, p}(r)$, $p \in [1, \infty]$, is discussed where $B_{\Omega, \mathcal{X}, p}(r)$ is the closed ball of the space $L_p(\Omega, \Sigma, \mu; \mathcal{X})$ centered at the origin with radius r , (Ω, Σ, μ) is a finite and positive measure space, \mathcal{X} is a separable Banach space. It is proved that the considered set valued map is Vietoris right lower semicontinuous at $p = 1$. Introducing additional geometric constraints on the functions from the ball $B_{\Omega, \mathcal{X}, 1}(r)$, a property, which is close to the Hausdorff right lower semicontinuity, is derived. An application of the obtained result to the set of integrable outputs of the input–output system

described by a Urysohn type integral operator is studied.

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