عنوان مقاله:

Characterization of semi-continuity in L^{p}-spaces

محل انتشار:

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نویسندگان:

Samwel Asamba - Department of Pure and Applied Mathematics, Kisii University, Box ۴۰۸-۴۰۲۰۰, Kisii-Kenya

Benard Okelo - Department of Pure and Applied Mathematics, Jaramogi Oginga Odinga University of Science and Technology, Box ۲۱۰-۴۰۶۰۱, Bondo, Kenya

Robert Obogi - Department of Pure and Applied Mathematics, Kisii University, Box ۴۰۸-۴۰۲۰۰, Kisii, Kenya

Priscah Omoke - Department of Pure and Applied Mathematics, Jaramogi Oginga Odinga University of Science and Technology, Box ۲۱۰-۴۰۶۰۱, Bondo, Kenya

خلاصه مقاله:

Upper and lower semi-continuous functions are important in many areas and play a key role in optimization theory. This paper characterizes the lower and upper semi-continuity of L^{p}-space functions. We prove that a function \vartheta:\mathcal L\rightarrow \overline{\mathbb R} is lower semi-continuous if and only if each convergent Moore-Smith sequence \{q_{j}\}_{j\in \mathbb N} converging to q\in \mathcal L implies that \int_{\mathcal L} \vartheta(q)d\mu\leq\liminf \int_{\mathcal L}\vartheta(q_{j})d\mu, \forall q\in \mathcal L. We further show that the sum of any two proper lower semi-continuous functions is lower semi-continuous and the product of a lower semi-continuous function by a positive scalar gives a lower semi-continuous function and the case of upper semi-continuous functions follows analogously. Additionally, we prove that for a function in an L^p-space L if \vartheta(\varphi)=\int_{\mathcal L}\varphi d\mu such that \varphi is measurable with respect to a Borel measure \mu, then \vartheta is upper semi-continuous.

کلمات کلیدی:

Lower semi-continuous function, Upper semi-continuous function, L^{p}-space