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Stable points of unit ball in Orlicz spaces

Abstract: The aim of this paper is to investigate stability of unit ball in Orlicz spaces, endowed with the Luxemburg norm, from the "local" point of view. Firstly, those points of the unit ball are characterized which are stable, i.e., at which the map $z \to \{(x,y) : \frac{1}{2}(x+y) = z\}$ is lower-semicontinuous. Then the main theorem is established: An Orlicz space $L^\varphi(\mu)$ has stable unit ball if and only if either $L^\varphi(\mu)$ is finite dimensional or it is isometric to $L^\infty(\mu)$ or φ satisfies the condition Δ_r or Δ_r^0 (appropriate to the measure μ and the function φ) or $c(\varphi) < \infty, \varphi(c(\varphi)) < \infty$ and $\mu(T) < \infty$. Finally, it is proved that the set of all stable points of norm one is dense in the unit sphere $S(L^\varphi(\mu))$.