COMPLEX INTERPOLATION OF ORLICZ SPACES WITH RESPECT TO A VECTOR MEASURE

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Abstract. Let X be a complex Banach space and $m : \Sigma \to X$ be a countably additive vector measure, where Σ is a σ-algebra of subsets of some nonempty set Ω. The Orlicz space $L^{\phi}(m)$ and the weak Orlicz space $L^{\phi}_w(m)$, associated to an N-function ϕ and to m, were introduced in [2] and they generalize the Banach function spaces $L^p(m)$ and $L^p_w(m)$, respectively, of (equivalence classes of) scalar p-integrable and weakly p-integrable functions with respect to m. The description of the complex interpolation spaces $[X_0, X_1]_{[\theta]}$ and $[X_0, X_1]^{[\theta]}$ for couples (X_0, X_1) where X_0 and X_1 are spaces $L^p(m)$ or $L^p_w(m)$ was obtained in [3]. In such a case, the first method always gives an $L^p(m)$-space and the second one yields an $L^p_w(m)$-space. More precisely, given $1 \leq p_0 \neq p_1 \leq \infty$, $0 < \theta < 1$ and $\frac{1}{p} = \frac{1-\theta}{p_0} + \frac{\theta}{p_1}$ we have

$$\begin{array}{rcl} [L^{p_0}_w(m), L^{p_1}(m)]_{[\theta]} & = & [L^{p_0}(m), L^{p_1}(m)]_{[\theta]} = L^p(m), \\ & & [L^{p_0}(m), L^{p_1}_w(m)]_{[\theta]} = L^p(m), \\ & & [L^{p_0}_w(m), L^{p_1}_w(m)]_{[\theta]} = L^p(m), \\ [L^{p_0}_w(m), L^{p_1}(m)]^{[\theta]} & = & [L^{p_0}(m), L^{p_1}(m)]^{[\theta]} = L^p_w(m), \\ & & [L^{p_0}(m), L^{p_1}_w(m)]^{[\theta]} = L^p_w(m), \\ & & [L^{p_0}_w(m), L^{p_1}_w(m)]^{[\theta]} = L^p_w(m). \end{array}$$

In this talk we are interested in studying if these interpolation formulae can be extended to the setting of Orlicz spaces with respect to a vector measure. It is based on a joint work with Ricardo del Campo, Antonio Fernández, Fernando Mayoral and Francisco Naranjo [1].

References

[1] R. Campo, A. Fernández, A. Manzano, F. Mayoral and F. Naranjo. *Complex interpolation of Orlicz spaces with respect to a vector measure*. Math. Nachr. **287** (2014), 23–31.

[2] O. Delgado. *Banach function subspaces of L^1 of a vector measure and related Orlicz spaces*. Indag. Math. **15** (2004), 485–495.

[3] A. Fernández, F. Mayoral, F. Naranjo and E. A. Sánchez-Pérez. *Complex interpolation of spaces of integrable functions with respect to a vector measure*. Collect. Math. **61** (2010), 241–252.