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An explicit expression for the K_r functionals of interpolation between L^p spaces. (English)

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When dealing with interpolation spaces by real methods one is lead to compute (or at least to estimate) the K -functional associated to the couple of interpolation spaces. This concept was first introduced by J. Peetre and some efforts have been done to find explicit expressions of it for the case of Lebesgue spaces. It is well known that for the couple consisting of L^1 and L^∞ on $[0, \infty)$ K is given by $K(t; f, L^1, L^\infty) = \int_0^t f^*$ where f^* denotes the non increasing rearrangement of the function f .

In [J. Approx. Theory 48, 322-327 (1986; Zbl 0617.46077)] *P. Nilsson* and *J. Peetre* computed the K -functional also between spaces L^p and L^q when $1 \leq p < q < \infty$. More recently the two first named authors obtained an explicit expression for a suitable modification of the K -functional for the case (L^p, L^M) where L^M stands for an Orlicz space [the first named authors, *ibid.* 60, No. 1, 11-23 (1990; Zbl 0714.46019)]. The aim of this paper is to answer a question raised by J. Peetre to the authors and to extend the results in the above cited papers for the more general case of the K_r -functionals between L^p spaces. The notion of K_r -functional was introduced in [J. Funct. Anal. 4, 88-94 (1969; Zbl 0175.42601)] by *T. Holmstedt* and *J. Peetre* obtaining also some estimates for those functionals between general compatible couples of interpolation spaces.

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