

## Amenability and harmonic $L^p$ -functions on hypergroups

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**Abstract.** Let  $K$  be a locally compact hypergroup with a left invariant Haar measure. We show that the Liouville property and amenability are equivalent for  $K$  when it is second countable. Suppose that  $\sigma$  is a non-degenerate probability measure on  $K$ , we show that there is no non-trivial  $\sigma$ -harmonic function which is continuous and vanishing at infinity. Using this, we prove that the space  $H_\sigma^p(K)$  of all  $\sigma$ -harmonic  $L^p$ -functions is trivial for all  $1 \leq p < \infty$ . Further, it is shown that  $H_\sigma^\infty(K)$  contains only constant functions if and only if it is a subalgebra of  $L^\infty(K)$ . In the case where  $\sigma$  is adapted and  $K$  is compact, we show that  $H_\sigma^p(K) = \mathbb{C}1$  for all  $1 \leq p \leq \infty$ .

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