

## IMPROVEMENTS OF BOUNDS FOR THE $q$ -GAMMA AND THE $q$ -POLYGAMMA FUNCTIONS

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**Abstract.** In this paper, the complete monotonicity property of functions involving the  $q$ -gamma function is proven and used to establish sharp inequalities for the  $q$ -gamma and the  $q$ -polygamma functions for all  $q > 0$ . These bounds for the  $q$ -gamma and the  $q$ -polygamma functions refine those given by Salem [17].

**Mathematics subject classification (2010):** 33D05, 26D07, 26A48.

**Keywords and phrases:** Inequalities,  $q$ -Gamma function,  $q$ -polygamma functions, completely monotonic function.

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