

Pastro, P. I.

The q-analogue of Hölder's theorem for the gamma function. (English) Zbl 0545.33004
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The basic gamma function $\Gamma_q(x)$ satisfies the recurrence relation $\Gamma_q(x+1)(1-q) = \Gamma_q(x)(1-q^x)$. By considering the logarithmic derivative of the basic gamma function $g(x)$ which satisfies the recurrence relation $g(x+1) = g(x)(q^x \ln q)/(1-q^x)$, it is shown that $g(x)$ cannot satisfy any algebraic differential equation of finite order. This same result also applies to the basic gamma function itself which establishes the required basic analogue of Hölder's theorem.

Reviewer: [H.Exton](#)

MSC:

[33B15](#) Gamma, beta and polygamma functions
[33E99](#) Other special functions

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