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**$q$ -derivative of basic hypergeometric series with respect to parameters.** (English)

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Summary: This article discusses the effect of the Difference operator  $D_q$  on the generalized hypergeometric series  ${}_r\varphi_s(a_1, \dots, a_r; b_1, \dots, b_s; q, z)$  with respect to parameters  $a_1, \dots, a_r; b_1, \dots, b_s$  and gives some  $q$ -difference equations satisfied by  ${}_r\varphi_s$ ,  $u$ -exponential function and  $q$ -Appell's hypergeometric series. Moreover, I will prove that the basic hypergeometric functions  ${}_r\Phi_s$  are basically completely monotonic with respect to parameters  $a_i, i = 1, 2, \dots, r$  if the parameter  $a_i$  is less than or equal to unity and the functions  ${}_r\Phi_s$  have positive  $q$ -derivative of all orders.

Finally, the basic hypergeometric functions  ${}_r\Phi_s$  are totally basically completely monotonic if all parameters are less than or equal to unity and the functions  ${}_r\Phi_s$  have positive  $q$ -derivative of all orders.

**MSC:**

- 30D15** Special classes of entire functions of one complex variable and growth estimates
- 33D15** Basic hypergeometric functions in one variable,  ${}_r\phi_s$
- 42C15** General harmonic expansions, frames

Cited in **4** Documents

**Keywords:**

basic hypergeometric series;  $q$ -difference operators;  $q$ -difference equations

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