

0901.33008

Chen, William Y.C.; Liu, Zhi-Guo

Parameter augmentation for basic hypergeometric series. I. (English)

Sagan, Bruce E. (ed.) et al., Mathematical essays in honor of Gian-Carlo Rota's 65th birthday. Boston, MA: Birkhäuser. Prog. Math. 161, 111-129 (1998). [ISBN 0-8176-3872-5/hbk; ISSN 0743-1643]

Let $E(z) = (-z; q)_\infty$ be the q -exponential function; the authors define the operator $E(b\theta)$, where $\theta f(a) = [f(aq^{-1}) - f(a)]/(aq^{-1})$; they prove that $E(b\theta)[(at; q)_\infty] = (at, bt; q)_\infty$, and that $E(b\theta)[(as, at; q)_\infty] = (as, at, bs, bt; q)_\infty / (abst/q; q)_\infty$. They call these properties "parameter augmentation". They use parameter augmentation to prove formulae on q -hypergeometric functions and q -integrals. For example, they prove Rogers identity, which contains three parameters, from a special case containing only one parameter. Many other examples are given. For a general method for proving identities on hypergeometric and q -hypergeometric functions, see *H. S. Wilf* and *D. Zeilberger* [Invent. Math. 108, 575-634 (1992; [Zbl 0739.05007](#))].

D. Duverney (Lille)

Keywords : umbral calculus; q -calculus; parameter augmentation; q -exponential function

Classification :

***33D20** Generalized basic hypergeometric series

05A40 Umbral calculus

05A19 Combinatorial identities

33D05 q -gamma functions, q -beta functions and integrals

05A40 Umbral calculus

Cited in ...