South East Asian J. of Mathematics and Mathematical Sciences
Vol. 19, No. 1 (2023), pp. 73-80

DOI: 10.56827/SEAJMMS.2023.1901.7 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

A NOTE ON HEINE'S TRANSFORMATION

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(**Received:** *Feb. 08, 2023* **Accepted:** *Mar. 10, 2023* **Published:** *Apr. 30, 2023)*

Abstract: In this paper, making use of $q-$binomial theorem different generalizations of Heine's first transformation have been discussed.

Keywords and Phrases: Heine transformation, bi-basic and multi-basic series, Ramanujan's theta functions.

2020 Mathematics Subject Classification: 33D15, 33D65.

1. Introduction, Notations and Definitions

The $q-$ rising factorial is defined as,

$$(a;q)_0 = 1, \quad (a;q)_n = (1-a)(1-aq)...(1-aq^{n-1}), \quad n \in (1,2,3,...),$$

where the parameter q is called the base and $|q| < 1$.
The infinite $q-$rising factorial is defined as,

$$(a;q)_\infty = \prod_{r=0}^{\infty}(1-aq^r) = \lim_{n\to\infty}(a;q)_n.$$

When k is complex number, we write

$$(a;q)_k = \frac{(a;q)_\infty}{(aq^k;q)_\infty}.$$