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On the Mathematical Nature of Guseinov's Rearranged One-Range Addition Theorems for Slater-Type Functions

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Starting from one-range addition theorems for Slater-type functions, which are expansion in terms of complete and orthonormal functions based on the generalized Laguerre polynomials, Guseinov constructed addition theorems that are expansions in terms of Slater-type functions with a common scaling parameter and integral principal quantum numbers. This was accomplished by expressing the complete and orthonormal Laguerre-type functions as finite linear combinations of Slater-type functions and by rearranging the order of the nested summations. Essentially, this corresponds to the transformation of a Laguerre expansion, which in general only converges in the mean, to a power series, which converges pointwise. Such a transformation is not necessarily legitimate, and this contribution discusses in detail the difference between truncated expansions and the infinite series that result in the absence of truncation

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