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Norms Related to Binomial Series

ABSTRACT. We present a number of results on norms which can be associated with the vectors $h_n = (h_n(k))_{k \in \mathbb{N}}$ in $\mathbb{R}^{\mathbb{N}}$, where

$$h_n(k) = \frac{n!}{k(k+1) \cdots (k+n)} = \frac{1}{k \binom{n+k}{n}}.$$

The norms of the h_n 's as elements of the usual sequence spaces ℓ_r belong to the family of 'binomial series'. We will present fairly good estimates for these norms, which we can even calculate in a few cases ($r = 1, \infty$ and $r = 2, 3$).

We also show that for 'almost all' p, q the matrix \mathcal{H} with entries $h_n(k)$ does not only define a bounded linear operator from ℓ_p into ℓ_q , but that this operator even enjoys rather strong compactness properties: nuclearity, membership in Schatten classes, etc. (joint work with **Herbert Hunziker**)