

## Weak Laws with Random Indices for Arrays of Random Elements in Rademacher Type $p$ Banach Spaces

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### Abstract

For a sequence of constants  $\{a_n, n \geq 1\}$ , an array of rowwise independent and stochastically dominated random elements  $\{V_{nj}, j \geq 1, n \geq 1\}$  in a real separable Rademacher type  $p$  ( $1 \leq p \leq 2$ ) Banach space, and a sequence of positive integer-valued random variables  $\{T_n, n \geq 1\}$ , a general weak law of large numbers of the form  $\sum_{j=1}^{T_n} a_j(V_{nj} - c_{nj})/b[\alpha_n] \xrightarrow{p} 0$  is established where  $\{c_{nj}, j \geq 1, n \geq 1\}$ ,  $\alpha_n \rightarrow \infty$ ,  $b_n \rightarrow \infty$  are suitable sequences. Some related results are also presented. No assumption is made concerning the existence of expected values or absolute moments of the  $\{V_{nj}, j \geq 1, n \geq 1\}$ . Illustrative examples include one wherein the strong law of large numbers fails.

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### Keywords

Array of rowwise independent random elements, Rademacher type  $p$  Banach space, Random indices, Weak law of large numbers, Weighted sums