GENERAL PRINCIPLES FOR NUMERICAL APPROXIMATION OF
STOCHASTIC PROCESSES ON SOME STOCHASTICALLY WEAK
BANACH SPACES
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Abstract: In this paper we shall discuss some main principles on approximation of stochastic processes \(X = (X_t)_{0 \leq t \leq T}\) on certain stochastic Banach spaces \(M_p = M_p([0, T], \mathcal{B}), \, p \in [1, +\infty)\). In a unique manner the concepts of almost sure \(\mathcal{B}\)-invariance, \(p\)-th mean consistency, mean consistency, \(p\)-th mean stability and \(p\)-th mean contractivity are combined to achieve \(p\)-th mean converging stochastic approximations \(X, Y \in M_p\) with values \(X_t, Y_t\) in randomized Banach space \(\mathcal{B}\) on any deterministic time-interval \([0, T]\). The principles are useful for the systematic construction of numerically \(p\)-th mean converging approximations.

Keywords: stochastically weak Banach spaces, stochastic approximations, \(\mathcal{B}\)-invariance, \(p\)-th mean consistency, mean consistency, \(p\)-th mean stability, \(p\)-th mean contractivity \(p\)-th mean convergence.

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