

Dedicated to my family, Prof. Dr. P.H. Müller and November 9, 1989

**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  $\mathbb{M}_p = \mathbb{M}_p([0, T], \mathbb{B})$ ,  $p \in [1, +\infty)$ . In a unique manner the concepts of almost sure  $\mathbb{B}$ -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  $X, Y \in \mathbb{M}_p$  with values  $X_t, Y_t$  in randomized Banach space  $\mathbb{B}$  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,  $\mathbb{B}$ -invariance,  $p$ -th mean consistency, mean consistency,  $p$ -th mean stability,  $p$ -th mean contractivity  $p$ -th mean convergence.

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