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# Strong Approximations of Martingale Vectors and Their Applications in

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摘要 The strong approximations of a class of  $Bbb$

$R^d$ -valued martingales are considered. The conditions used in

this paper are easier to check than those used in [3] and [9]. As

an application, the strong approximation of a class of

non-homogenous Markov chains

is established, and the asymptotic properties are established for the multi-treatment Markov chain adaptive designs in clinical trials.

关键词 [Martingale, Non-homogenous Markov chain, Wiener processes, strong approximation, adaptive designs, asymptotic properties.](#)

分类号

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**Abstract**

**Key words**

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