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ON THE ABSOLUTE CONVERGENCE OF FOURIER SERIES FOR SOME CLASSES OF ALMOST PERIODIC STOCHASTIC PROCESSES

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The purpose of this paper is to find the conditions of absolute convergence of Fourier series of the stochastic processes $X(t, \omega) \in L^2_{s.a.p.}$

In chapter I, we find the Fourier series and the Parseval relation of $X(t, \omega) \in L^2_{s.a.p.}$ after investigating some properties of $X(t, \omega) \in L^2_{s.a.p.}$ In chapter II, first we define the concept of mean modulus of continuity which is a generalization of T. Kawata's integrated continuity modulus. Next we make the first of our main theorems about the absolute convergence of Fourier series of $X(t, \omega) \in L^2_{s.a.p.}$ by means of mean modulus of continuity. Finally we deal with the case of the stochastic processes which are of bounded variation. When the stochastic processes have this bounded variation property, we find some properties and theorems about their Fourier coefficients. These constitute the second and the third of our main theorems. These results are generalizations of T. Kawata's results in the case of periodic stochastic processes.

In chapter III, as applications, we treat weakly stationary processes and harmonizable processes. First we investigate the special forms of the conditions, which have been studied in chapter II, in the case of weakly stationary processes by using their spectral representations. Next we also investigate the special forms of the conditions in the case of harmonizable processes by using their spectral representations.

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