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**CONDITIONAL CYCLIC RANDOM PROCESS AS MATHEMATICAL MODEL OF VIBRATIONAL SIGNALS AND PROCESSES WITH DOUBLE STOCHASTICITY**

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***Research methodology.*** *In this study the methods of probability theory and random processes has been used.*

***Results.*** *The new mathematical model of cyclic signals class in the form of conditional cyclic random process has been defined which takes into account their cyclical stochasticity morphological and rhythmic structures. The new mathematical model of the cyclic signal rhythm in the form of the random rhythm functions of the conditional cyclic random process has been described, make it possible to increase informativeness of rhythm analysis in automated information systems, due to more complete and detailed the rhythm description.*

***Novelty.*** *In this study the new mathematical model of the vibrational signals and processes in the form of conditional random process has been defined, which unlike their known models, make it possible to take into account their double stochasticity, that is, take into account stochasticity of the morphological and rhythmic structures of the cyclical signals at the same time. Random rhythm function of cyclic signal unlike the known rhythm models has much more advantages for the accuracy and informativeness of rhythm analysis, because under these conditions is the possibility of continuous increase the “resolution” and informativeness of rhythm analysis.*

***The practical significance.*** *The new model, in the form of conditional cyclic random process eliminates the discrepancy between the model of cyclic random processes and the stochastic models of the rhythm and significantly expands simulation tools and analysis rhythmic structure of the vibrational processes within the framework the stochastic approach, providing additional features for increasing the accuracy and informativeness of processing of the different physical nature and structure cyclical signals. Using the random rhythm functions for the rhythm heart analyze, makes it possible to fully take into account information about its time structure, which is the basis for increasing accuracy of the cyclic signals rhythm diagnostic, including cardiac rhythm in computer cardiac systems.*