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E. D. GLADKY

BAYESIAN MODEL OF STATISTICAL ESTIMATION OF TECHNICAL SYSTEM RELIABILITY BASED ON RESULTS OF TESTS WITH IMPROVEMENTS

The traditional techniques of assessments of freedom from failures based on the results of improvement tests (reliability-growth models, models that take into account the effectiveness of improvements, Bayesian Markov models) for a binomial test pattern are analysed and their disadvantages are reported. In order to determine the reliability based on the results of improvement tests, the modified Bayesian approach is proposed. A special feature of the model proposed is to use as a prior information the point estimate of reliability determined by the analysis of the effectiveness of improvements and the uncertainty interval for an unknown value of a priori standard deviation. The calculated relations for a posterior evaluation of the technical system reliability and its standard deviation in the process of experimental testing considering improvements are obtained and a practical application of the proposed mathematical model is proposed. The developed mathematical model allows the consideration of the effect of improvements carried out during experimental system tests on assessments of freedom from failures.

Keywords: *binomial test pattern, improvement, probability of failure-free operation, reliability growth model, Bayesian model, effectiveness of introduced improvement.*

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