Confidence limits for the reliability index of a system featuring dual modular redundancy of various subsystem components

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The article deals with a topical applied and theoretical problem of confidence estimation of reliability indices for complex systems, based on the results of testing their components, such as elements or subsystems, separately. We consider a model of a system featuring full or partial component redundancy in various subsystems for the case of hot redundancy. For the case of high component reliability we supply an approximate solution to the problem of using the results of system component testing to plot the bottom confidence limit for one of the main reliability indices, namely time between failures of this system guaranteed by a predefined validity equation. We also obtained a solution to the problem of determining the extent of testing various subsystem elements that is necessary to validate the desired requirements for the system reliability index. As a conclusion, we present examples of numerically computing confidence limits based on the expressions derived for the system reliability index.

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