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可靠性

考虑右删失数据的改进Jelinski-Moranda软件可靠性模型

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摘要： 针对软件可靠性测试停止时间不对应失效的右删失问题,给出考虑完全右删失失效数据的改进Je-linski-Moranda(J-M)模型。定量分析了右删失失效数据对可靠性参数评估值的影响,在此基础上分别给出基于残存缺陷比率、失效率以及可靠度函数的软件可靠性测试停止准则。最后将改进模型应用于一组失效数据集,计算结果表明,改进后的模型可充分挖掘右删失数据中蕴含的时间信息,得到更准确的参数评估值。并且所提出的停止准则可有效指导软件可靠性测试活动的开展,具有较好的工程应用价值。

关键词： Jelinski-Moranda模型 右删失数据 软件可靠性测试 测试停止准则

Modified Jelinski-Moranda model with right-censored data

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Abstract: The non-failure stops(viz,the stopping time of the testing doesn’t correspond to a failure) of software reliability testing can be viewed as a type of right-censored failure data.However,the traditional J-M model can’t deal with this type of right-censored data directly.To resolve this problem,a modified J-M model with respect to the right-censored data is presented.Based on this modified model,the effect of the right-censored data on the estimations of the model parameters is analyzed,and then three separate stopping criteria for software reliability testing with regard to the ratio of residual defects,reliability and failure density are proposed.Finally,the modified model is applied on a classical failure data set.The results of the application show that the proposed model can deal with the right-censored data well since it can fully utilize the time information contained in the right-censored data.

Keywords: J-M model right-censored data software reliability testing stopping criteria

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