Modified Jelinski-Moranda Software Reliability Model with Imperfect Debugging Phenomenon

Abstract

In this paper, we have modified the Jelinski-Moranda (J-M) model of software reliability using imperfect debugging process in fault removal activity. The J-M model was developed assuming the debugging process to be perfect which implies that there is one-to-one correspondence between the number of failures observed and faults removed. But in reality, it is possible that the fault which is supposed to have been removed may cause a new failure. In the proposed modified J-M model, we consider that whenever a failure occurs, the detected fault is not perfectly removed and there is a chance of raising new fault/faults due to wrong diagnosis or incorrect modifications in the software. In this paper, we develop a modified J-M model which can describe the imperfect debugging process. The parameters of our modified J-M model are estimated by using maximum-likelihood estimation method. Applicability of the model has been shown on the failure data set of Musa.

References

- Musa, J. D., Iannino, A., and Okumoto, K. 1990. Software Reliability: Measurement,
Modified Jelinski-Moranda Software Reliability Model with Imperfect Debugging Phenomenon


Index Terms

Computer Science  
Software Engineering
Keywords
Software Reliability  Jelinski-moranda Model  Failure  Maximum Likelihood Estimation  Imperfect Debugging