Abstract

Nonhomogeneous Poisson process based software reliability models play an important role in developing software systems and enhancing the performance of computer software. As software reliability grows on the basis of the execution of computer test runs. Nonhomogeneous Poisson process type of discrete-time software reliability models, or difference equations, is more realistic and often provides better fit than their continuous-time counterparts. Since discrete-time model conserves the properties of the continuous-time model, the estimation of its parameter would be simpler and more accurate. In this paper, we explore the importance of testing resource and imperfect debugging phenomenon consideration in software reliability growth modeling. The resultant model is very useful for the reliability analysis as the measure of reliability is computed considering the distribution of testing-effort, influence of the testing efficiency and the changes of the testing process. Using the resultant model, testing-effort control, change-point concept and optimal release policy have also been investigated. Therefore, this paper thus provides a new insight into development of discrete-time modelling in software reliability engineering, that could be of immense help to the software project manager.
in monitoring and controlling the testing process closely and effectively allocating the resources
in order to reduce the testing cost and to meet the given reliability requirements.

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**Index Terms**

Computer Science  
Software Engineering

**Keywords**

Software reliability, software testing, imperfect debugging, nonhomogeneous Poisson process, change-point, effort control, software release policy.