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### **Abstract**

The applications of computer systems have been increased immensely during the last few decades and the system reliability is major concern which is depends upon reliability of software and hardware components. Software testing is quality assurance process which confirms that the product is error free and reliable. The reliability of software is major quality attribute which ensure failure free operations and maintainability, therefore reliability assessment is necessary. Software reliability control the optimal release time and cost of software development. In this paper various fault detection and removal strategies are discussed to increase the reliability. A software reliability growth model with imperfect debugging based on Non-homogenous Position Process (NHPP) model is incorporated. The reliability estimation is based on testing and operational reliability of systems. The various numerical parameters are examined and results are presented with the GA tool of MATLAB for optimal release policy based on cost and reliability criterion.

### **References**

1. Frankl et.al.[1998], 'Evaluating testing methods by delivered reliability', IEEE Transactions on Software Engineering, 24(8), page(s) 586-601, doi: 10.1109/32.707695.
2. Kapur and Bardhan [2006], 'Statistical Models in Software Reliability and Operations' Research, Springer Handbook of Engineering Statistics 2006, pp 477-496 Print ISBN 978-1-85233-806-0.
3. Bashir et. al. [2008], 'Reliability and Validity of Qualitative and Operational Research Paradigm' Pakistan Journal of Statistics and Operation Research, Vol. 4. No. 1, Jan 2008, pp35-45.
4. Tevfik and Toros[2013], 'Imperfect debugging in software reliability: A Bayesian approach', Elsevier in its journal European Journal of Operational Research Volume (Year):2013. [4]Peng et al.[2014], 'Testing effort dependent software reliability model for imperfect debugging process considering both detection and correction', Reliability Engineering & System Safety, Volume 126 . pp. 37-43. ISSN 0951-83203
5. Agarwal et al.[2010], 'Optimal testing resource allocation for modular software considering imperfect debugging and change point using genetic algorithm', DOI:10.1109/ICRESH,2010
6. Rafi and Akthar[2010], 'Imperfect Debugging SRGM with Software Module Testing and Resource Allocation Dependent Release Policy' International Journal of Computer applications, © 2010.
7. Lyu [1996], 'Handbook of Software Reliability Engineering', IEEE Computer Society Press and McGraw-Hill, 1996.
8. Pham[2000], Software Reliability, Springer, Singapore,2000.
9. Xie[1991], Software Reliability Modelling, World Scientific Publishing Company, 1991
10. Huang et al.[2003], 'A Unified Scheme of Some Non-Homogeneous Poisson Process Models for Software Reliability Estimation', IEEE Transactions on Software Engineering, vol. 29, no. 3, March 2003, pp. 261-269.
11. Prasad et al.[2012], 'SRGM with Imperfect Debugging by Genetic Algorithms', International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 8, August 2012 ISSN: 2277 128X
12. Rana and Bilandi[2013], 'A Genetic Based Intelligent Approach to Estimate Software Release Using Agile'MIS Review Vol. 18, No. 2, March (2013), pp. 19-50, 2013.
13. Quadri et al.[2011], 'Optimal Software Release Policy Approach Using Test Point Analysis and Module Prioritization', Global Journal of Computer Science and Technology Volume 11 Issue 2 Version 1.0 February 2011,online ISSN: 0975-4172 & Print ISSN: 0975-4350.
14. Agarwal et al.[2012], 'Genetic Algorithm Based optimal testing effort allocation problem for modular software, BVICAMs, International Journal of Information Technology ,vol. 4,No.1,pp-17.
15. Boland and Chuiv[2007], 'Optimal Times for software release when the repair is imperfect', Statistics and probability Letters,Vol.77, No. 12,pp1176-1184.
16. Chang and Liu[2009], 'A Generalized JM model with applications to imperfect', Vol 33, No.9, pp3578-3588.
17. Chartterjee et al.[2012], 'Effect of change point and imperfect debugging in software reliability and its optimal release policy' Mathematical and Computer Modelling, of Dynamic Systems, Vol. 18, No. 5,pp 539-551
18. Jain and Priya[2005] 'Software reliability issues under operational and testing

constraints', Asia-Pacific Journal of Operational Research, Vol.22, No.1 pp 33-49.

19. Jain et al.[2012], 'Software reliability growth model(SRGM) with imperfect debugging, fault reduction and multiple change-point, International Journal of Mathematics in operation research.

20. Okumoto and Goel[1980], 'Optimum release time for software system based on reliability and cost criteria', The journal of system and software, Vol.14, No. 1, pp 315-318.

21. Pham [1996], 'software cost model with imperfect debugging, random life cycle and penalty cost, International journal of system science, Vol 27, No 12 pp 453-463.

22. Prasad et al. [2010], 'SRGM with imperfect debugging by genetic algorithm', International Journal of software engineering and applications, Vol. 1, No 2, pp 66-79.

23. Minhora and Tohma[1995], 'Parameter estimation of hyper geometric distribution software reliability growth model by genetic algorithms', proceedings of sixth international journal of software Engineering.

24. Painton and Cambell[1995], 'Genetic Algorithm in optimization of system reliability', IEEE transactions on reliability, Vol 44, No. 2, pp172-178.

25. Farr and Smith[1988], 'A tool for statistical modelling and estimation of reliability functions for software', Journal of system software, Vol. 8 No. 1, pp 47-55.

26. Goldberg DE[1989], 'Genetic Algorithms in search, optimization and Machine Learning', Addition-Wesley.

27. jain et al.[2013], 'Prediction of reliability growth and warranty cost of software with fault reduction, imperfect debugging and multiple change point, international', journal of operation research.

### Index Terms

Computer Science

Algorithms

### Keywords

Reliability growth, Non-homogeneous Poisson process Genetic Algorithm, Optimal release policy.