A Study on the Reliability Effect of Operational S/W by Failure Rate Change

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Abstract

The failure rate decreasing status is observed uninterruptedly even without any change of S/W products. Namely, the software reliability grows for the same time passage even if there is no failure debugging.

I propose simple approaching method to do this status model without model modification. considering operational S/W reliability in this paper.

1. Introduction

The S/W reliability model that describes such debugging status is defined as SRGM[1]. Previous researcher[2] performed other study based on the theory that the reliability grows through the debugging for the failure during testing and operational stages. The researcher[3], however, made a conclusion that the S/W reliability deteriorates as time goes by because the failure rate does not decrease during operational stage.

One of the reasons that the reliability grows during operational stage is that user learns how to manipulate and use it, and then avoids such circumstances as command and activity. The other factor for this reason is the reliability problem for the S/W features. If you install the new software to existing system, the new software does not harmonize with current mechanism.

I propose simple approaching method to do this status model without model modification. considering operational S/W reliability in this paper.

2. S/W Reliability during operational stage

2.1 operational reliability

According to the papers studied up to now the release time has been determined assuming A/S(after service) may be possible even after software release.[2, 7] But, furthermore reliability growth is difficult because the developer releases it to the unspecified people in case of universal software. If time interval is in an operation stage, the next failure time follows the exponential distribution with parameter λ_r. The reliability equation during operation is as follows.

$$R_o(x|s) = \exp(-\int_0^x \lambda_r dt) = \exp[-\lambda(s)x] \quad (2.1)$$

The reliability of S/W during operation is difficult because the debugging is not easy and then the failure intensity is uniform. I consider that the failure intensity decreases as exponential function as shown in Fig. 2-1. The initial decreasing portion represents the failure decreasing and from that point $\lambda=\lambda_r$ the