

Investigation of Aspect-Oriented Metrics for Stability Assessment: A Case Study

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Abstract— Stability assessment provides software managers with early insight into trends in software evolution, and thus assists them in managing and controlling long-lived software systems. However, there are few empirical studies that have been conducted to relate software metrics with external quality attributes of aspect-oriented software in general, and metrics have not been evaluated as indicators of aspect stability in particular. This paper investigates the relationships between 13 aspect-oriented metrics and aspect stability. These metrics measure different structural properties of an aspect: size, coupling, cohesion, and inheritance. A case study was conducted using an open source aspect-oriented software consisting of 76 aspects. The results obtained from this study indicate statistically significant correlation between most of the size metrics and aspect stability. The cohesion metric was also found to be significantly correlated with aspect stability. In addition, different prediction models were built using different combinations of metrics' categories. It was observed that the best accuracy was achieved as a function of some of the size and inheritance metrics.

Index Terms— software metrics, stability, aspect-oriented software.