# Software Reliability Evaluation of Digital Plant Protection System Development Process Using V&V

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## Abstract

In the nuclear power industry, digital technology has been introduced recently for the Instrumentation and Control (I&C) of reactor systems. For its application to the safety critical system such as Reactor Protection System(RPS),a reliability assessment is indispensable. Unlike traditional reliability models, software reliability is hard to evaluate, and should be evaluated throughout development lifecycle. In the development process of Digital Plant Protection System(DPPS), the concept of verification & validation (V&V) was introduced to assure the quality of the product. Also, test should be performed to assure the reliability. Verification procedure with model checking is relatively well defined, however, test is labor intensive and not well organized. In this paper, we developed the methodological process of combining the verification with validation test case generation. For this, we used PVS for the table specification and for the theorem proving. As a result, we could not only save time to design test case but also get more effective and complete verification related test case set. Add to this, we could extract some meaningful factors useful for the reliability evaluation both from the V&V and verification-combined tests.