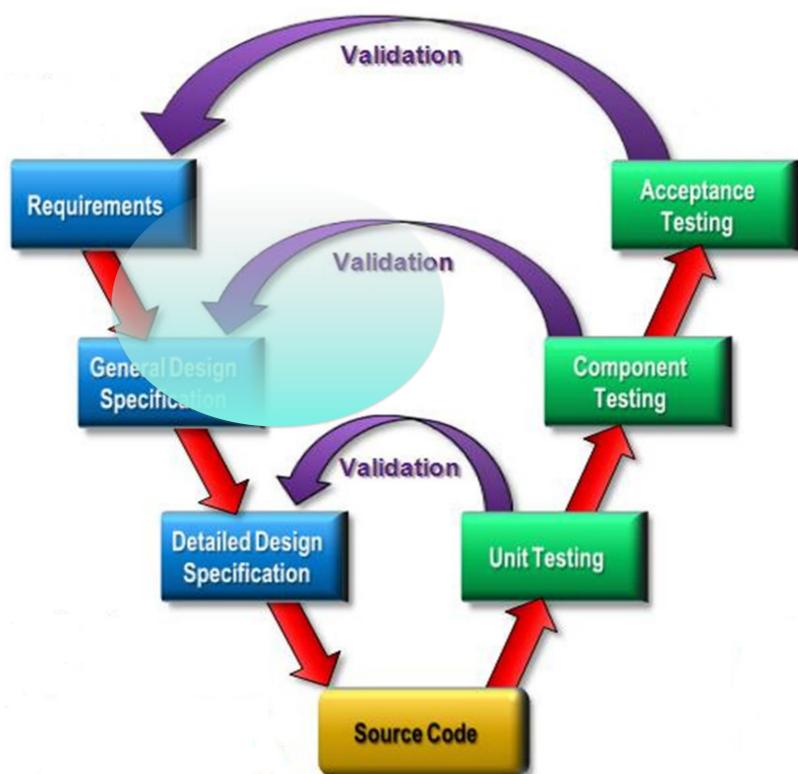


❖ Context and Problems

- To ensure a high level of reliability of the behavior of Embedded Software, it is essential to carry out at the earliest steps in its development cycle, an analysis of how it reacts to its environment. The whole system (software and environment) is specified in a **heterogeneous** manner and contains **discrete and continuous** behaviors.

- The use of **SysML** allows the analysis of these specifications with formal techniques such as symbolic execution, **qualitative simulation**, model checking, etc. But for industrial sized systems, these techniques face the problem of combinatorial explosion that forces the user to adapt its specifications to keep simulation time small enough.

- A possible adaptation is the functional decomposition of the specification. Another possibility is to perform partial validation, either on selected scenarios, or by stochastic exploration techniques. In both cases, the analysis of the overall system is weakened and makes it difficult to evaluate the quality of the system.



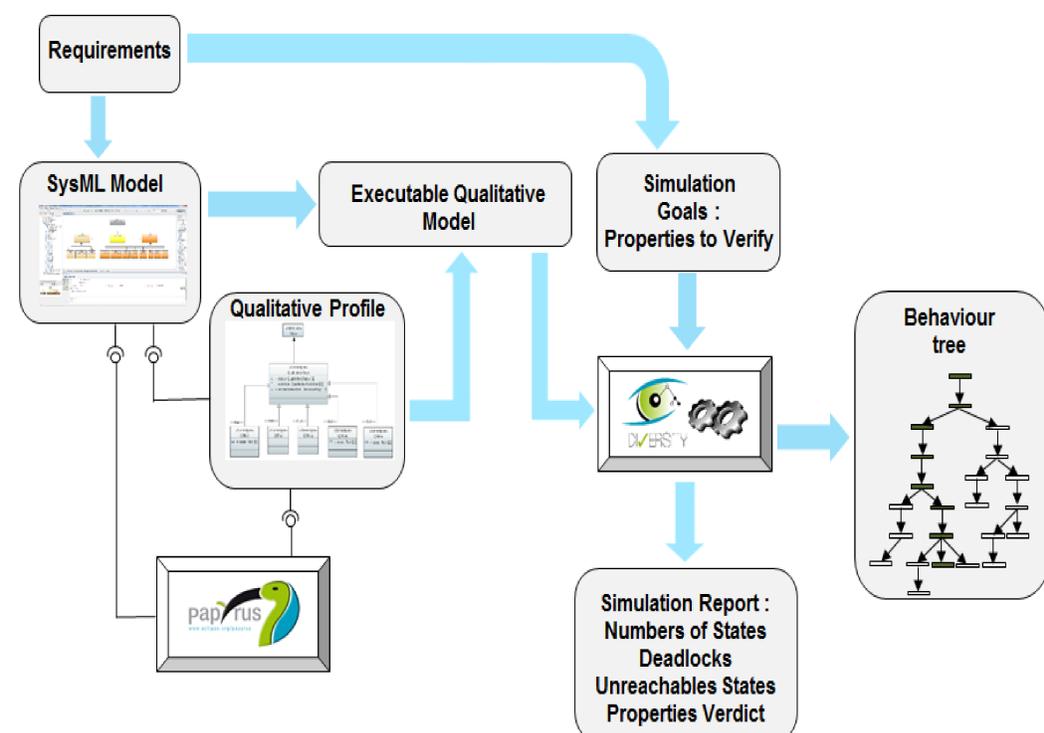
Our position in the V Model

❖ Methods and Tools

- Use of the Papyrus platform to model the system
- Use of the Diversity tool, which is based on the **symbolic execution** of state machines to generate digital tests, build the behavior tree of the system and analyze requirements properties.

❖ Purpose

- The challenge is to propose a methodology for analysis, based on tools within the scope of **hybrid** systems.
- The modeling will be based on the SysML language.
- The results of the analysis will identify scenarios corresponding to the possible system behaviors, some of which may be critical (deadlocks, unreachable states, unstable states ...).
- These scenarios can also be used to automatically generate data for simulation and testing



Our Design Approach

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