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SCOLA: a Scenario Oriented LAnguage for railway system specifications

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1. Context

- Concept
- System definition
- Risk Analysis

2. Objective

- Formal model
- System specification
- Obatn a graphical representation

3. The idea

- System architecture: Functional view, Structural view, Behavioral view, Functional scenarios
- How?
- At the very first steps of the system design
- Where?
- Identifying the abstract concepts of the system and their relationships
- When?
- Instead of looking at systems options, we must identify systems concepts
- Build a formal modeling language based on the concepts and that fits the behavior of the system

4. A system in SCOLA

- Identifier
- System
- Component
- Function
- Abstraction level
- Operator: Precedence, Parallelism, Assignment, Refinement

5. The concepts of SCOLA

- Textual
- Graphical
- Precedence $f_1 \rightarrow f_2$
- Parallelism $f_1 || f_2$
- Choice $f_1$ or $f_2$
- Cooperation $C_1 \rightarrow C_2$
- Assignment by $C_1$
- Refinement $L_1 \downarrow L_{n+1}$

6. Case Study

The Arrival At Station Scenario
- fo1: The wayside selects the stopping point
- fo2: The wayside sends the stopping point to the train
- fo3: The train triggers the braking system
- f1: The train detects that it is at the stopping point
- f2: The train triggers the braking system
- f3: The train sends the braking information to the driver

7. Graphical Representation

8. Textual Representation

9. Conclusion

- A novel scenario based modeling formalism
- Relies on a formal semantics
- Provides multiple levels of abstraction
- Generic enough to be used for all the complex systems
- A stepping stone for the dysfonctional scenarios modeling

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