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Nota di contenuto	Foundations of System Specification (IFIP WG 1.3) -- From informal requirements to COOP: a concurrent automata approach -- A framework for defining Object-Calculi extended abstract -- European Theory and Practice of Software (ETAPS) -- A translation of statecharts to esterel -- An operational semantics for timed RAISE -- Data abstraction for CSP-OZ -- Systems development using Z generics -- A brief summary of VSPEC -- Enhancing the pre- and postcondition technique for more expressive specifications -- Program Verification -- On excusable and inexcusable failures towards an adequate notion of translation correctness -- Interfacing program construction and verification -- Software verification based on linear programming -- Integration of Notation and Techniques -- Sensors and actuators in TCOZ -- The UniForM workbench a universal development environment for formal methods -- Integrating formal description techniques -- Formal Description of Programming Concepts (IFIP WG 2.2) -- A more complete TLA -- Formal justification of the rely-guarantee paradigm for shared-variable concurrency: a semantic approach -- Relating Z and first-order logic -- Open Information Systems -- Formal modeling of the enterprise javabeans™ component integration framework -- Developing components in the presence of re-entrance --

Communication and synchronisation using interaction objects -- Modelling microsoft COM using ?-calculus -- Co-design -- Validation of mixed signal-alpha real-time systems through affine calculus on clock synchronisation constraints -- Combining theorem proving and continuous models in synchronous design -- Parts a partitioning transformation system -- A behavioral model for co-design -- Refinement -- A weakest precondition semantics for an object-oriented language of refinement -- Reasoning about interactive systems -- Non-atomic refinement in Z -- Refinement semantics and loop rules -- Safety -- Lessons from the application of formal methods to the design of a storm surge barrier control system -- The value of verification: positive experience of Industrial proof -- Formal development and verification of a distributed railway control system -- Safety analysis in formal specication -- Formal specification and validation of a vital communication protocol -- Incremental design of a Power transformer station controller using a controller synthesis methodology -- OBJ/Cafe OBJ/Maude -- Verifying behavioural specifications in CafeOBJ environment -- Component-based algebraic specification and verification in cafeOBJ -- Using algebraic specification techniques in development of object-oriented frameworks -- Maude as a formal meta-tool -- Hiding more of hidden algebra -- Abstract State Machines (ASM) and Algebraic Methods in Software Technology (AMAST) -- A termination detection algorithm: specification and verification -- Logspace reducibility via abstract state machines -- Formal methods for extensions to CAS -- An lgebraic framework for higher-order odules -- Avionics -- Applying formal proof techniques to avionics software: a pragmatic approach -- Secure synthesis of code: a process improvement experiment -- Cronos: a separate compilation tool set for modular esterel applications -- Works-in-Progress -- Tool support for production use of formal techniques -- Modeling aircraft mission computer task rates -- A study of collaborative work: answers to a test on formal specification in B -- Archived design steps in temporal logic -- A PVS-based approach for teaching constructing correct iterations -- A minimal framework for specification theory -- A model of specification-based testing of interactive systems -- Algebraic aspects of the mapping between abstract syntax notation one and CORBA IDL -- Retrenchment -- Proof preservation in component generalization -- Industrial Experience -- Formal modelling and simulation of train control systems using petri nets -- Formal specification of a voice communication system used in air traffic control an industrial application of light-weight formal methods using vdm -- Model-checking the architectural design of a fail-safe communication system for railway interlocking systems -- Analyzing the requirements of an access control using VDMTools and PVS -- Cache coherence verification with TLA%.

Sommario/riassunto

Formal methods are coming of age. Mathematical techniques and tools are now regarded as an important part of the development process in a wide range of industrial and governmental organisations. A transfer of technology into the mainstream of systems development is slowly, but surely, taking place. FM’99, the First World Congress on Formal Methods in the Development of Computing Systems, is a result, and a measure, of this new-found maturity. It brings an impressive array of industrial and applications-oriented papers that show how formal methods have been used to tackle real problems. These proceedings are a record of the technical symposium ofFM’99:alo- side the papers describingapplicationsofformalmethods,youwill ndtechnical reports, papers,andabstracts detailing new advances in formaltechniques,from mathematical foundations to practical tools. The World Congress is the

successor to the four Formal Methods Europe Symposia, which in turn succeeded the four VDM Europe Symposia. This s- cession re?ects an increasing openness within the international community of researchers and practitioners: papers were submitted covering a wide variety of formal methods and application areas. The programmecommittee re? ects the Congress’s international nature, with a membership of 84 leading researchersfrom 38 di erent countries.The comm- tee was divided into 19 tracks, each with its own chair to oversee the reviewing process. Our collective task was a di cult one: there were 259 high-quality s- missions from 35 di erent countries.