

Applications of the Matrix Model of Computation

Author: Sergio Pissanetzky. Research Scientist. Member, IEEE.

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Abstract

The Matrix Model of Computation (MMC) is a new Turing-equivalent and Quantum-equivalent virtual machine used for the mathematical analysis of systems. The MMC allows uniform techniques to be applied to all kinds of systems and makes them amenable to formal mathematical manipulation. But the strength of the MMC lies in its applications. In this paper we use simple examples to illustrate three very different applications. First, in Physics, we examine a thought experiment in Newtonian Mechanics. The Scope Constriction Algorithm factorizes the equations and discovers a law of Physics. Similar ideas can be applied to compare theories, search for fundamental symmetries, or test new hypotheses.

Second, in business, we note that business rules are semantically similar to the MMC and sketch some ideas for their direct conversion to MMC format. Since the MMC is a relational database, and many businesses already use relational databases, we argue that much of the procedure can be automated. Since the MMC is also a program and can be directly compiled, this offers a direct path from business rules to executable code without programming.

Lastly, in Software Engineering, we examine relationships between the MMC and UML class models, MMC support for encapsulation, inheritance and polymorphism, and the use of the MMC for refactoring OO code.

Keywords: semantic web, mathematical model of computation, relational model of computation, refactoring, object oriented, ontology, physics.