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NONLINEAR PHENOMENA - SYMBOLIC DYNAMICS AND NATURAL COMPUTING

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Abstract. *Some relationships between computing, physics and dynamical systems are explored in this presentation.*

Natural computing is a framework where various types of problems are addressed, namely problem solving techniques inspired by nature, the use of computers to simulate natural phenomena and the use of natural phenomena to compute.

Systems that exhibit complex behavior, such as certain nonlinear systems, can be designed to perform computational tasks. Examples are analog computers, either mechanical or electronic, DNA computing, quantum computing among many other possibilities.

Several models and concepts are discussed here, relating computation, automation and nonlinear dynamics, in particular shift spaces, cellular automata and reservoir computing. Symbolic dynamics is introduced and developed as a fundamental, natural technique relating nonlinear phenomena and computation.