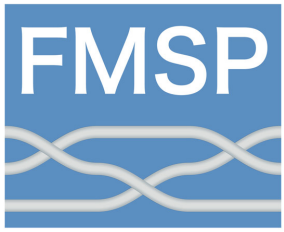

FMSP Lectures

Complexity and Computability:
Complex Dynamical Systems beyond Turing-Computability

Klaus Mainzer
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June 23 (Thursday) 15:00 ~ 16:30 Room 056

Abstract: The computational theory of complexity is founded by digital computing (e.g. Turing machine) which cannot fully grasp continuous concepts of mathematics. The mathematical theory of complex dynamical systems (with interdisciplinary applications in natural and economic sciences) is based on continuous concepts. Further on, there is an outstanding tradition in mathematics since Newton, Leibniz, Euler et al. with real algorithms in, e.g., numerical analysis. How can the gap between the digital and continuous world be mathematically overcome? The talk aims at mathematical and philosophical foundations and interdisciplinary applications of complex dynamical systems beyond Turing-computability.

References: K. Mainzer, *Thinking in Complexity*, 5th edition Springer: New York 2007 (Japanese translation of the 1st edition 1997); *Symmetry and Complexity. The Spirit and Beauty of Nonlinear Science*, World Scientific: Singapore 2005; *Local Activity Principle. The Cause of Complexity* (with L.O. Chua), Imperial College Press: London 2013; *The Universe as Automaton. From Simplicity and Symmetry to Complexity* (with L.O. Chua), Springer: Berlin 2011; *Die Berechenbarkeit der Welt*, C.H. Beck: Munich 2014; *Numbers* (with H.-D. Ebbinghaus, H. Hermes, F. Hirzebruch et al.), 3rd edition Springer: Berlin 1983 (Japanese translation).