

Controlling delayed complex systems

Andreas Otto¹

¹*Institute of Physics, TU Chemnitz, 09107 Chemnitz, Germany (e-mail: otto.a@mail.de)*

Time delay systems play an important role in physics, chemistry, biology and engineering. Time delays appear, for example, in systems where signal propagation, memory effects or processing delays cannot be neglected. In many applications the systems are nonlinear and/or complex, which means that they are composed of different subsystems interacting with each other. They can be described by nonlinear delay differential equations or nonlinear delayed partial differential equations and exhibits a rich variety of dynamics. Many applications are based on complex solutions of these systems, and therefore, strategies are required to control not only time invariant and homogeneous steady states of complex systems but also time-varying and possibly inhomogeneous solutions. In this talk several strategies are presented, which are used to control such systems. We present some typical examples ranging from laser dynamics with external time-delayed feedback over networks with time delays in the coupling structure to pattern formation in spatially extended systems.