

CHAOS²⁰¹⁶

BOOK OF ABSTRACTS

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Chaotic Solutions and Global Indeterminacy in a Resource Optimal Model

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The paper investigates the dynamical properties of a resource optimal system derived by Wirl (2004) and Bella (2010). To this end, we determine the whole set of conditions which lead to global indeterminacy and, eventually, chaotic behavior outside the small neighborhood of the Balance Growth Path (see, for example, Mattana et al., 2009, Nishimura and Shigoka, 2006, Venturi, 2014). The model possesses a rich spectrum of dynamic behavior that goes, as the parameters of the model are tuned, from a stable equilibrium point to a Hopf cycles, either super-critical or sub-critical (see Mattana and Venturi 1999, Neri and Venturi 2007). Here, we focus on a parameter region of local determinacy. We show the possibility of global indeterminacy and chaos in its subset. Our route to chaos exploits the existence of a homoclinic orbit to a saddle-focus equilibrium. The dynamics near these homoclinic orbits has been discovered and investigated by using the Shilnikov Theorem. This involves hyperbolic horseshoes close to the homoclinic orbit, but possibly also periodic attractors and strange attractors. It might be impossible to characterize the system for a full set of parameter spaces, and the boundary of a chaotic region. We describe the "routes to chaos", and a bifurcation diagram, where one could see how a change in some parameters can lead to a series of bifurcations: the emergence of a saddle-focus, of a homoclinic orbit, and chaos.

Keywords: Externality, Global Indeterminacy, Homoclinic orbits, Chaos Attractor.

The Estimation of Transmission Information Quality in Secure Communication Systems Based on Deterministic Chaos

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The development of communication systems based on chaotic signal generators for hidden data transmission is topical issue in modern scientific researches. However, a level of information hiding depends on values of parameters system and choice of transmission scheme. The target of this paper is the estimation of secrecy degree and quality of information transmission for different analog and digital communication