CHAOS 2017

BOOK OF ABSTRACTS

10th Chaotic Modeling and Simulation International Conference

Editor
Christos H. Skiadas

30 May - 2 June 2017
Barcelona, Spain

Chaotic Solutions and Global Indeterminacy in The Romer Endogenous Growth Model

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This article is aimed at developing some results on the existence of chaotic behaviour and indeterminacy in a modified version of Romer's model, (see Slobodyan S., 2006).
More in detail, we study the dynamics of a non-linear three-dimensional system associated to the Romer model of endogenous growth, a system with a single equilibrium point, which is already know to possesses a rich spectrum of behaviour that goes, as the parameters of the model are changed, from a stable equilibrium point, to more complex dynamics. We exploit a route to chaos via the existence of a homoclinic orbit to a saddle-focus equilibrium. This involves the existence of horseshoes close to the homoclinic orbit, but possibly also periodic attractors and strange attractors.
By using the undetermined coefficient method, we analytically demonstrate that there exists a homoclinic orbit of a Shilnikov type that connects the single equilibrium point to itself (see, Shang D., Han M., 2005). Furthermore, the nature of the growth paths in this chaotic regime might depend on the initial conditions, and looked noisy, like the simple function of a stochastic process.
It might be thus 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.
Finally, the economic intuition behind our results are deeply exploited and fully investigated.

Squeeze Film Dynamics of Grooved Rotating Disks

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A computational model model is presented for the engagement process of two grooved, rotating disks by linking the mechanical force acting on the disks to a model for squeeze film flow. The Greenwood-Williamson model of asperity contact, and flow factors are used to capture the effect of rough surfaces. The density function from measured roughness is used to characterize the mechanical contact. The effects of temperature change in the fluid and disks are simulated by a simple heat transfer