University of Pretoria Yearbook 2020

Dynamical systems 782 (WTW 782)

Qualification	Postgraduate
Faculty	Faculty of Natural and Agricultural Sciences
Module credits	15.00
Programmes	BScHons Applied Mathematics
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Introduction to the general theory of dynamical systems and to the theory of dynamical systems represented via systems of ODEs. Quantitative and qualitative analyses of linear systems. Qualitative analysis of nonlinear systems: domain, invariant sets, stability of equilibria, Hartman-Grobman theorem, centre manifold theorem, Lyapunov method. Structural stability and bifurcation. Bifurcation of equilibria. Hopf bifurcation. Applications: population models, chemical reactions, circuits.