



Univerza v Mariboru
University of Maribor

Fakulteta za naravoslovje in
matematiko / Faculty of Natural
Sciences and Mathematics



OPIS PREDMETA / SUBJECT SPECIFICATION

Predmet:	Fraktali
Subject Title:	Fractals

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Izobraževalna matematika, enopredmetni študij, 2. stopnja		2.	1.

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. Vaje Lab. Work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30		15			45	3

Nosilec predmeta / Lecturer:

Dušan PAGON

Jeziki /

Predavanja / Lecture:

slovenski / Slovenian

Languages:

Vaje / Tutorial:

slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje
študijskih obveznosti:

Prerequisites:

Jih ni.

None.

Vsebina:

Contents (Syllabus outline):

- Metričen prostor, različne vrste podprostorov, prostor fraktalov.
- Afine transformacije, skrčitve, sistemi iterirajočih funkcij.
- Dinamika fraktalnih množic.
- Teoretično in eksperimentalno določanje dimenzije fraktala, Hausdorff-Bezikovičeva dimenzija.

- A metric space, different types of subspaces, the space of fractals.
- Affine transformations, contraction mappings, systems of iterating functions.
- Dynamics on fractal sets.
- The theoretical and experimental determination of the fractal dimension, Hausdorff-Besicovitch dimension.

Temeljni študijski viri / Textbooks:

Barnsley, M. F.: Fractals Everywhere. Academic Press, Boston (1988); Second edition (1993)
Barnsley, M. F.: Superfractals. Cambridge University Press, Cambridge (2006)
Devaney, R. L.: Chaos, Fractals and Dynamics - Computer Experiments in Dynamics, Addison-Wesley (1990)
Edgar, G: Classics on Fractals. Westview Press, Boulder (1992)
Falconer, K. J.: The Geometry of Fractal Sets. Cambridge University Press, Cambridge (1985)

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Cilji:

- Študenti se seznaniijo s strukturo podprostora fraktalov v metričnem prostoru in z osnovnimi načini generiranja fraktalov (družine iterirajočih preslikav). Spoznajo tudi definicijo dimenzije fraktala.

Objectives:

- Students get familiar with the structure of the subset of fractals in a metric space and with the main ways of generating fractals (iterated functions systems). They also learn the definition of the fractal dimension.

Predvideni študijski rezultati:
Znanje in razumevanje:

- aktivno obvladanje strukture metričnega prostora in prepoznavanje fraktalnih podmnožic
- teoretično in eksperimentalno določanje dimenzije fraktalov

Prenesljive/ključne spretnosti in drugi atributi:

- sposobnost generiranja fraktalov
- izračun dimenzije fraktalne množice

Metode poučevanja in učenja:

- Predavanja
- Seminarske vaje
- Individualno delo

Intended learning outcomes:
Knowledge and Understanding:

- active knowledge of metric space structure and the ability to recognize its fractal subsets
- theoretical and experimental ways for finding the dimension of a fractal

Transferable/Key Skills and other attributes:

- the ability to generate fractals
- the calculation of fractal dimension

Learning and teaching methods:

- Lectures
- Tutorial
- Individual work

Načini ocenjevanja:

Delež (v %) /
Weight (in %)

Assessment:

- seminarska naloga
- ustni izpit

20%
80%

- coursework
- oral exam

Materialni pogoji za izvedbo predmeta :

- Predavalnica

Material conditions for subject realization

- Lecture hall

Obveznosti študentov:

(pisni, ustni izpit, naloge, projekti)

- ustni izpit, seminarska naloga

Students' commitments:

(written, oral examination, coursework, projects):

- oral exam, coursework