

Centro de Investigação em Matemática e Aplicações
Departamento de Matemática
Programa de Doutoramento em Matemática

Seminário

04 de maio de 2022

CLAV – anfiteatro 1 – 15h

**Kinematics: classification methods and combinatorial
invariants for complex motion in biology**

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We present methods from discrete dynamical systems which are used to classify and simulate complex motion. We consider a two-parameter family of bimodal interval maps which give the displacements through iteration. A trajectory is composed of patches of linear motions, intertwined by changes of direction.

The characterization of the types of movements is obtained from the topological classification of the interval map family. We use methods from symbolic dynamics and topological Markov chains, and the main classifying tool is the kneading invariant - the symbolic itinerary of the critical orbits of the interval maps.

We present part of a catalogue or dictionary of typical trajectories. For each kneading invariant we determine certain features such as topological entropy, average area covered, length distribution probability, among others.



UNIVERSIDADE DE ÉVORA
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