# NUMERICAL TOOLS IN THE STUDY OF LOW DIMENSION NONLINEAR MAPS

Daniele Fournier-Prunaret*,
Department of Electrical Engineering and Computer Science
INSA Toulouse
135 av de Rangueil, 31077 Toulouse Cedex, France
e-mail: daniele.fournier@insa-toulouse.fr

**Abstract** *The study of maps, even in low dimensions 1, 2 or 3, implies the use of numerical tools or mixing between analytical studies and numerical ones. The aim of this talk is to present how the study of bifurcation structures or attractors and their basin is related to numerical computation and how it is necessary to use redundancy to avoid mistakes or artefacts. Indeed, for instance, chaotic attractors and fractal bifurcation structures are very common and can lead to chaotic transient in such maps. The existence of multistability and fuzzy basin boundaries can also generate problems in determining the right attractor and the true evolution of the considered system. Such problems and others are presented by the way of specific examples.*