

# Sage

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After an introduction and survival guide to the Sage mathematics software, we will organize a tutorial session illustrating various aspects of the school. Since the computational skills of the students are expected to be pretty heterogeneous, we will propose worksheets of different kinds so that student could choose according to their level and interests.

Proposed tutorials will include:

- Simulation of dynamical systems. We will emphasize pitfalls related to the various representations of real numbers in the numeric iteration of functions (symbolic, algebraic, floating-point, interval and ball arithmetics).
- Construction of interactive applets to help visualize the evolution of their behaviour with respect to some parameters (bifurcations, transition to chaos). Such parameterized dynamical systems appear in population dynamics.
- A tutorial about tiling a finite region by a given list of polyominoes. Besides its practical interest and its relation with the lectures, this tutorial will be the occasion to introduce some generic problem-solving techniques: backtracking, integer linear programming.