

## Symmetries and invariant solutions for evolutionary equations

### *Abstract:*

The presentation will point out some basic facts on how nonlinear dynamical systems described through differential equations can be investigated using the *Lie symmetry method*. The method supposes to find the group of transformations which leave invariant the class of solutions for a given differential equation. These symmetry transformations can be used for determining the *invariants* of the considered evolutionary equation and, based on that, the *reduced equation*. The reduced equation has a simpler mathematical form and could be solved. Its solutions have to be solutions for the initial equation, too. So, following this approach, one can obtain particular class of solutions for the initial equation. The method is known as similarity reduction.

The general algorithm will be exemplified on few 2D equations describing models of transport phenomena important for environmental studies.