

# ***Analysis of Coarse Behaviour and its Parameter Dependency in Multi-Scale Systems and Controlled Lab Experiments***

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The coarse behaviour and its parameter dependency in complex systems is investigated. Two methods are introduced: First, an implicit equation-free analysis which allows to analyse the macroscopic behaviour of given microscopic models by numerical bifurcation analysis even though no explicit equations are given on the macroscopic level. Second, a model-free analysis, which allows a bifurcation analysis directly at laboratory experiments. The latter includes the possibility to investigate unstable situations in experiments which are otherwise not observable but are very important to understand the system behaviour. Examples from mobility problems, namely traffic jam formation on highways and pedestrian flow around an obstacle will illustrate the mathematical concepts.