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Comparison of mathematical models for the dynamics of the Chernivtsi children disease
joint work with Igor Nesteruk and Jürgen Prestin

Different mathematical models are built of a selection of mechanisms, and they reproduce observations in a quantitatively different manner. A suitable error functional is used to compare the models and to detect mechanisms, which probably caused the observations. For this aim, parameter identification is seen as the determination of a best approximation out of the set of feasible solutions of the model, which can be identified with the set.

Here, the comparison of different model approaches is discussed with respect to observation data from a disease that occurred 1988 in Chernivtsi in Ukraine, the cause of which is unclear until today. The quantitative measure of the error functional as well as selected qualitative properties are used to distinguish the models. Even though only a small set of data for the number of affected persons is available, a comparison of an intoxication model and an epidemical model suggest that the cause of the disease is rather an infection than an intoxication.

Furthermore, some aspects of model identification and model sensitivity against parameters are given by hands of the data from the Chernivtsi children disease. We demonstrate that a sensitivity and robustness investigation should be done together with the mathematical modeling and the presentation of simulation results to allow a reasonable insight into the power of the model.