

**The conference is supported by the
National Laboratory for Health Security project
RRF-2.3.1-21-2022-00006**

Parameter estimation using bifurcation points

HRIDYA VINOD VARMA

Interdisciplinary Center for Scientific Computing, Heidelberg University, Germany

`hridya.varma@iwr.uni-heidelberg.de`

Bistable behaviour and oscillatory patterns have often been observed in experimental studies of some ecological, chemical and mechanical systems. Some examples of such systems are the Belousov–Zhabotinsky reaction, the glycolytic pathway, predator-prey ecosystems and aircraft wings. Mathematical models describing the dynamics of these systems often attribute this behaviour to bifurcations. These bifurcation points can be experimentally measured by slowly varying the experimental controls until a sudden change in behaviour is observed. We propose a novel parameter estimation framework that uses these measured bifurcation points to estimate the parameters of the mathematical model. This approach is particularly useful when time-series data is not available for the usual parameter estimation methods used in mathematical modelling.