# Analysing existence of states

Anas A Rana

Complexity Science
University of Warwick
NKI-Amsterdam

February 18, 2012

## Biological example

- Two proteins in a system
- Antigen that binds to both
- Impossible to tell which one binds

## Definition

- Different parameter values correspond to the same model
- Model is unidentifiable

$$\tilde{X}(t) = Pr(\tau > t)A_1^t \, x(0) + \sum_{j=0}^{t-1} Pr(j < \tau \leq j+1) \, A_2^{t-j}A_1^j \, x(0)$$

# Data sets

|                  | ER-Src        | pBABE        |
|------------------|---------------|--------------|
| Tamoxifen (TAM)  | $9$ timepoints | $4$ timepoints |
| Ethanol          | $3$ timepoints | $3$ timepoints |

Table: Combinations of drugs in different runs

## ER-Src

- Src expression leads to development of cancers

## pBABE

- Retroviral vector, delivers genes into genome
- Empty insertion to check position of insertion

*Hirsch et al. 2010*