

Analysis of Gene Regulatory Networks

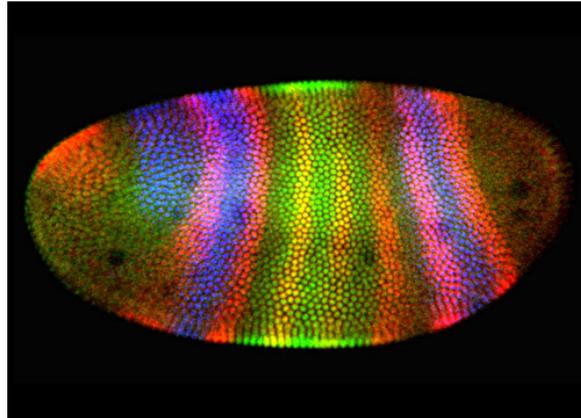
Analyse genregulatorischer Netzwerke

Dozentinnen: Prof. Bockmayr, Sun



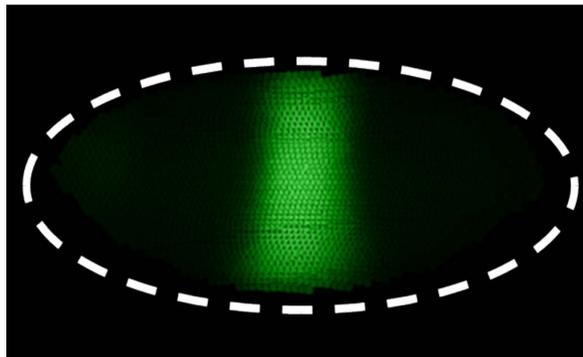
Gene Regulatory Networks (GRN)

Drosophila, stripes.

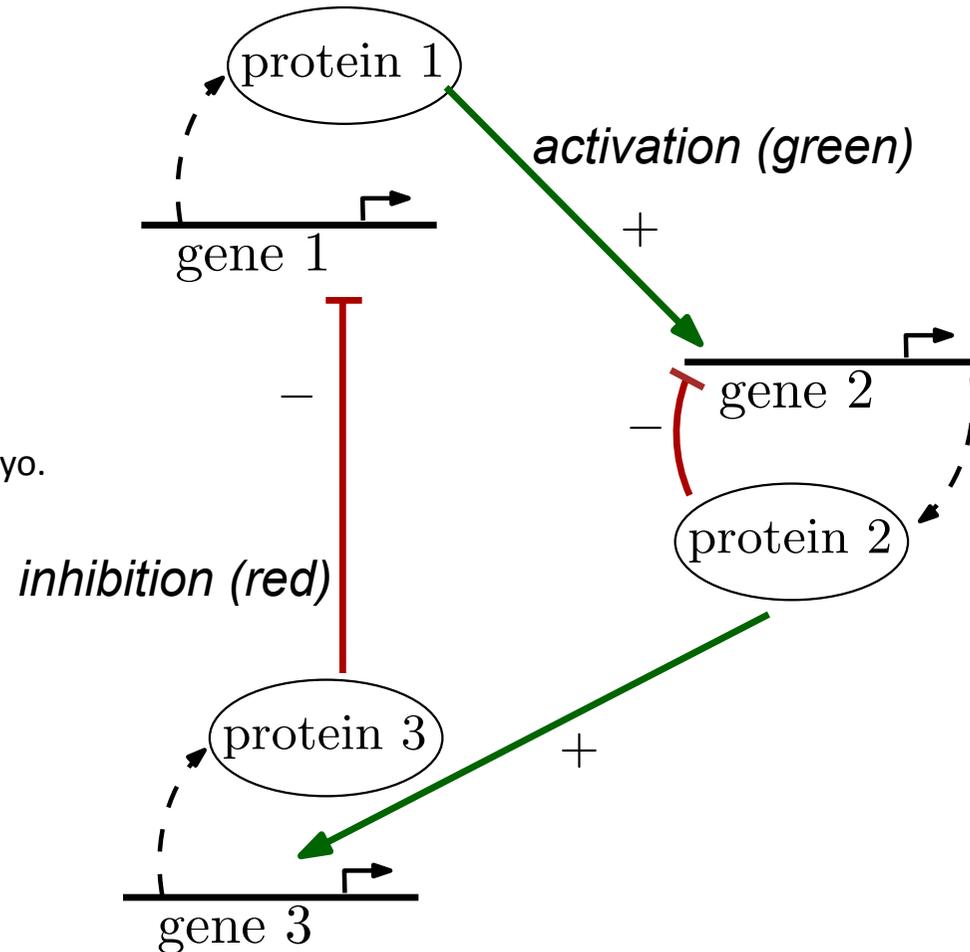


[Paddock, 2001] Stripes of the Drosophila embryo.

A single stripe

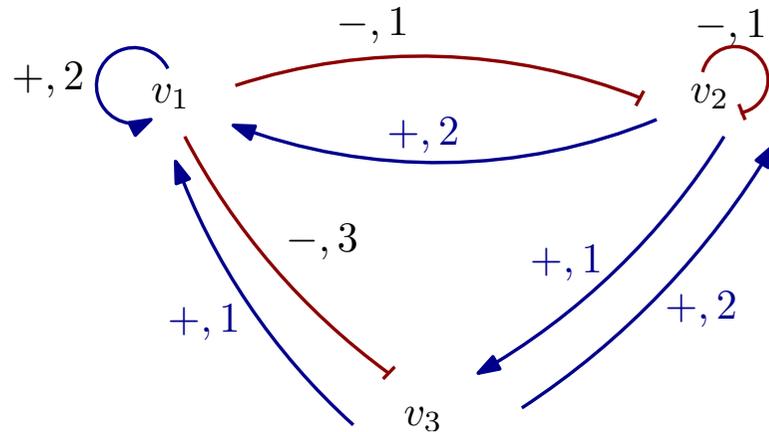


FlyEx database. [Cotterell, Sharpe, 2010]

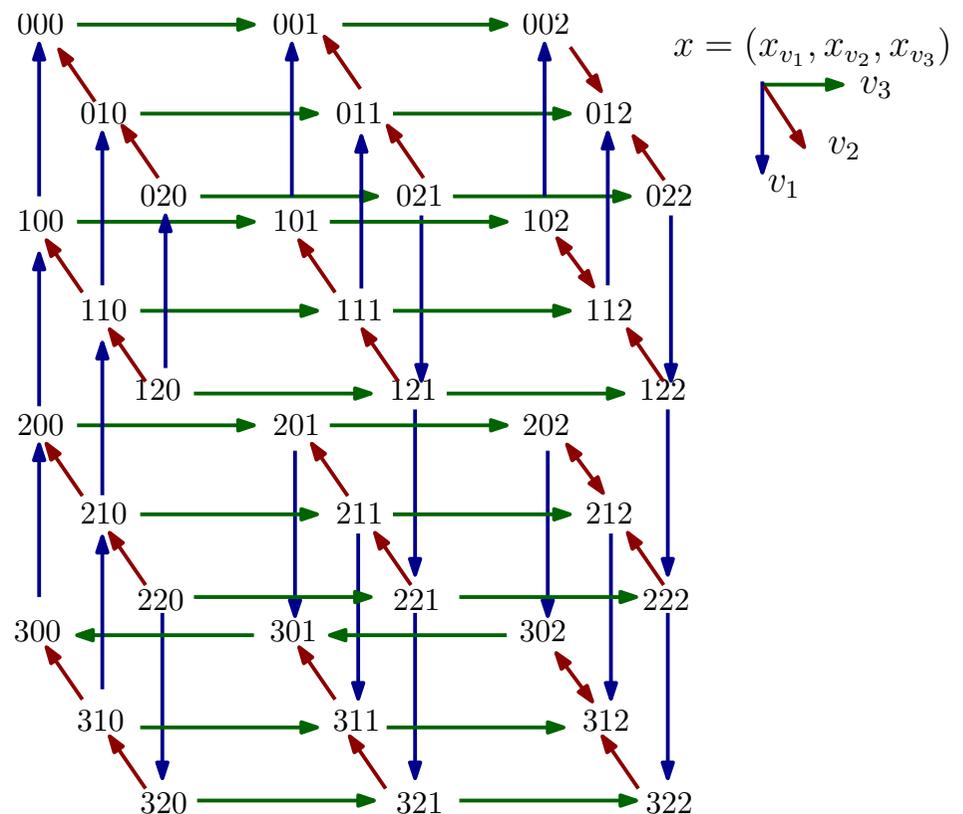


Gene Regulatory Networks and the Dynamics

- Interaction graph (IG)
 - Nodes: genes and their products
 - v_1, v_2, v_3
 - Edges: regulations with thresholds

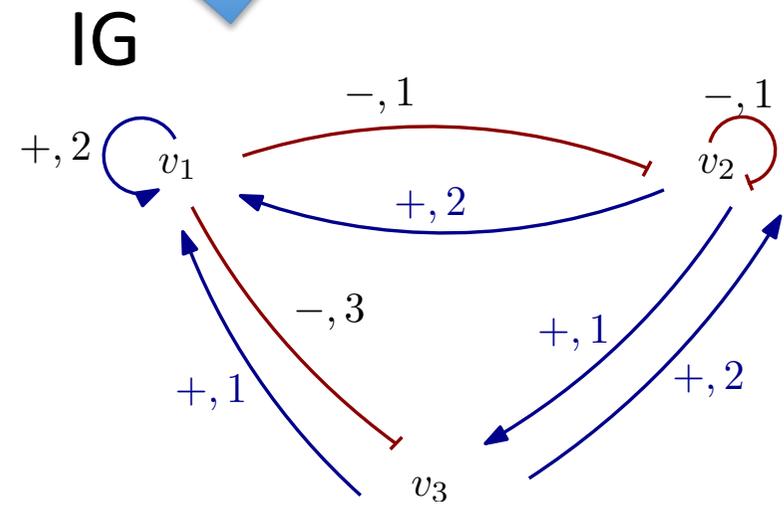
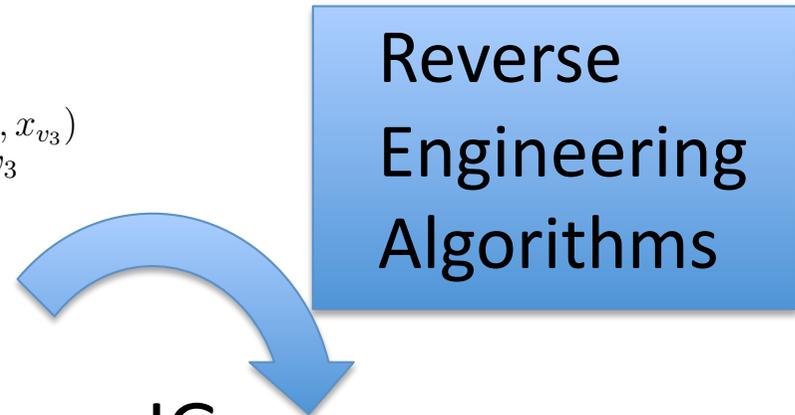
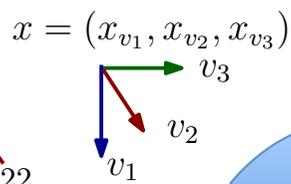
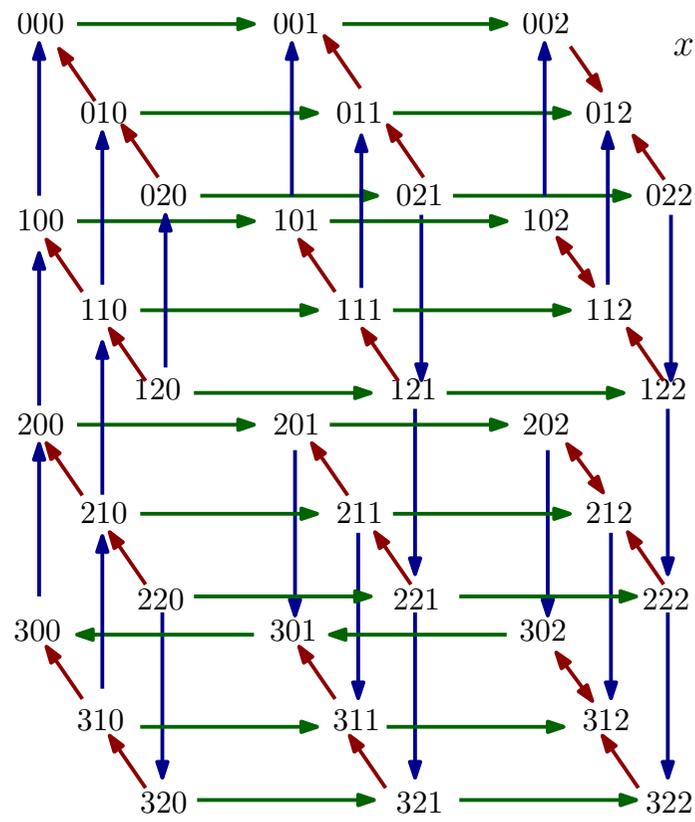


- State transition graph (STG)
 - States: $x(v_1, v_2, v_3)$
 - State transitions



Reverse Engineering: from STG to IG

- Dynamics: STG



Our Goals

- By the end of this project, hope we can achieve:
 - Understand discrete modelling of gene regulatory networks and their dynamics
 - Implement some reverse engineering algorithms
 - Apply the codes on some real biological examples

Important information

- Language: English.
- Duration: within 8 weeks.
- Expected starting time:
 - end of February / beginning of March
- Programming language:
 - Matlab (mainly),
 - or Python.
- Email: lingsun@zedat.fu-berlin.de

Thank you for your attention!