Loose Ends, Remarks, Footnotes, ...

Christoph Flamm

Institute for Theoretical Chemistry
University Vienna

http://www.tbi.univie.ac.at/~xtof/

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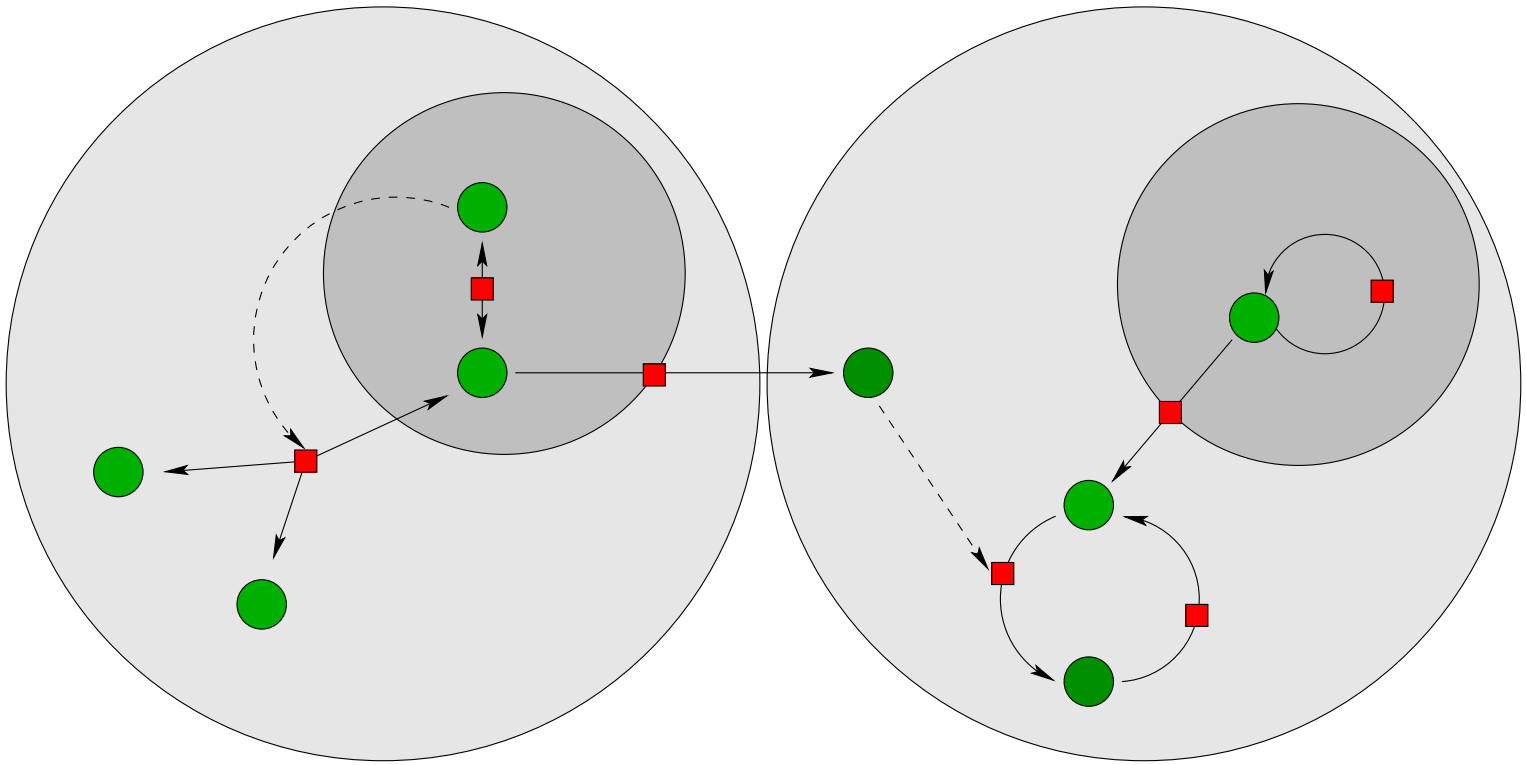
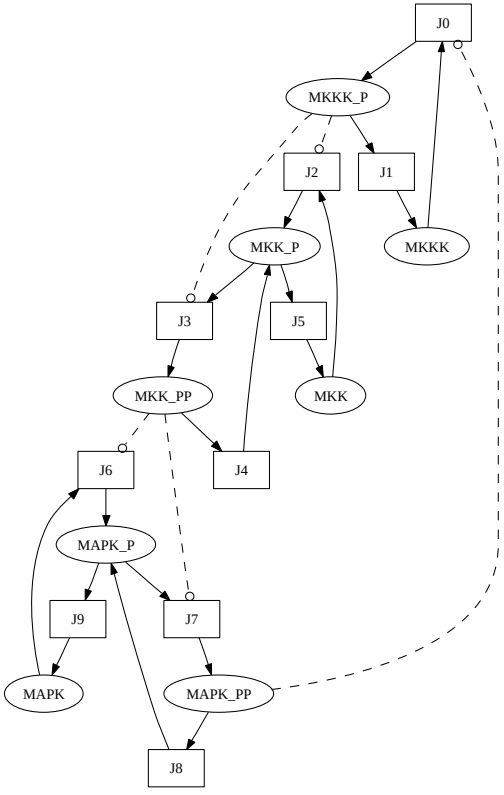
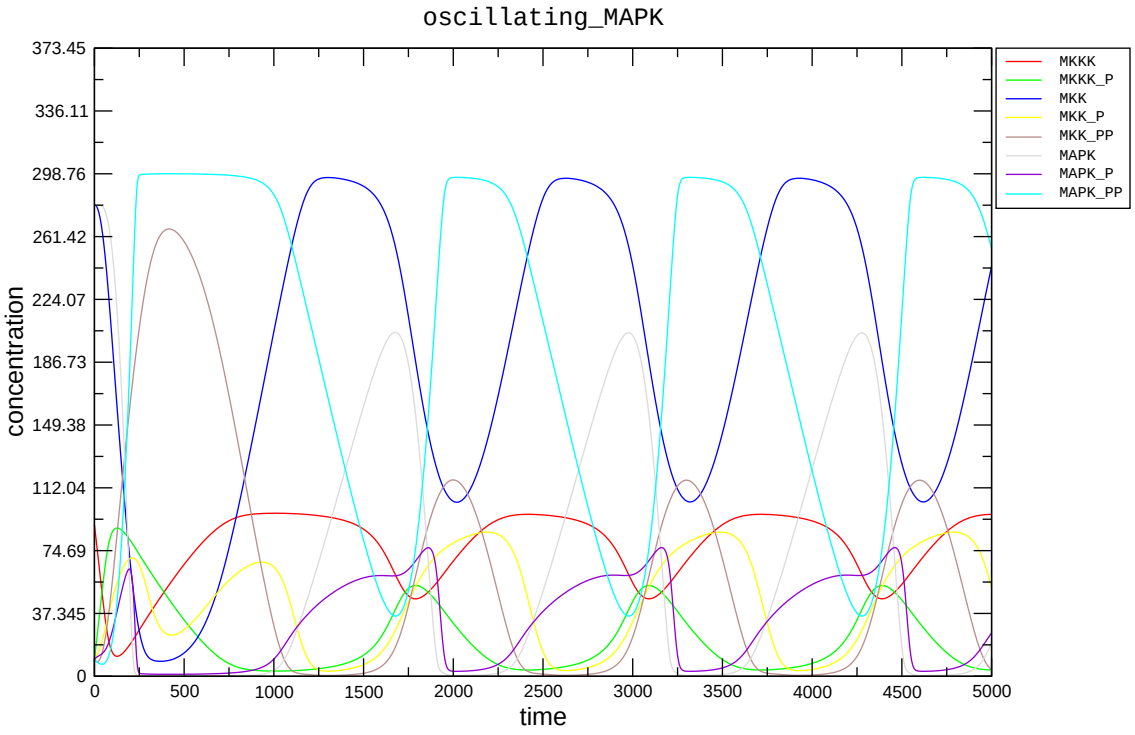
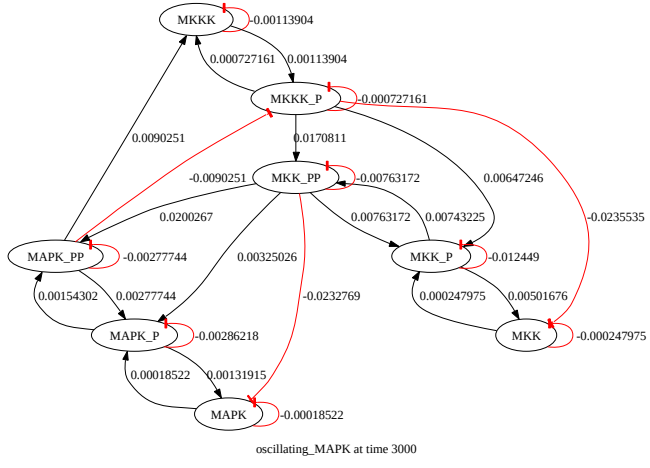
SBML the *lingua franca* for Compututational Models



The SBML_odeSolver







Inverse Problem Primer

Definition due to Hadamard, 1915: Givien mapping $A : X \to Y$, equation

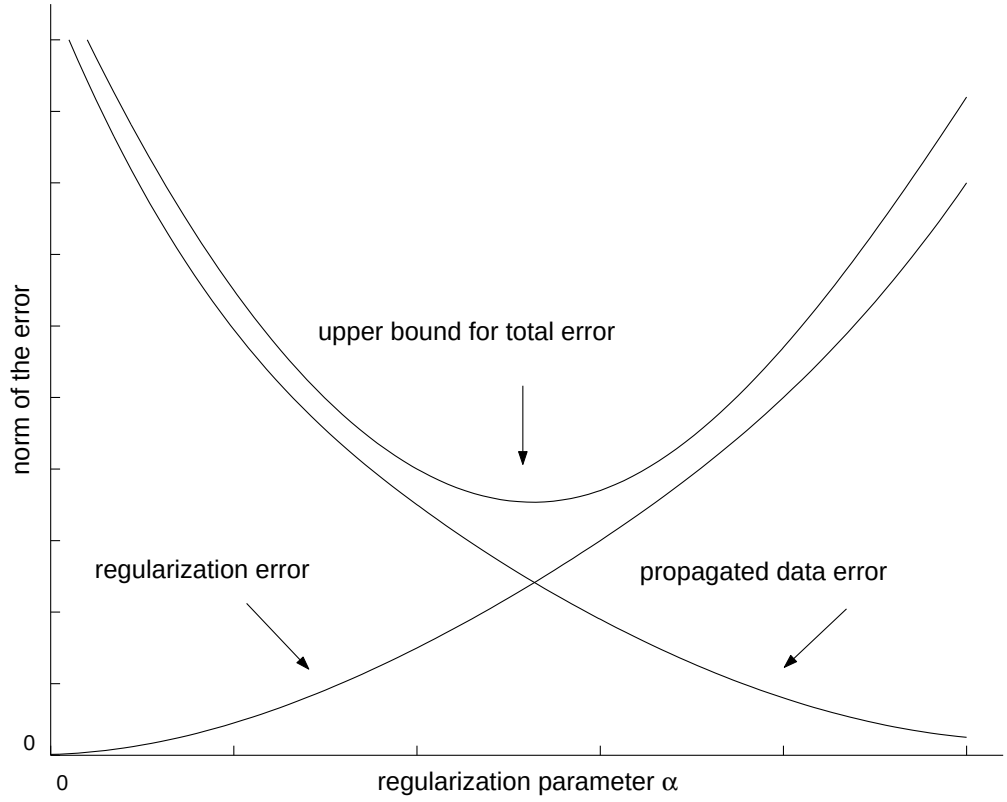
$$A\mathbf{x} = \mathbf{y}$$

is well-posed povided

- (Existence) For each $\mathbf{y} \in Y, \exists \mathbf{x} \in X$ such that $A\mathbf{x} = \mathbf{y}$
- (Uniqueness) $A\mathbf{x_1} = A\mathbf{x_2} \implies \mathbf{x_1} = \mathbf{x_2}$.
- (Stability) A^{-1} is continuous.

Equation is ill-posed if one of the above conditions is violated.

Regularization a way to overcome Instabilities

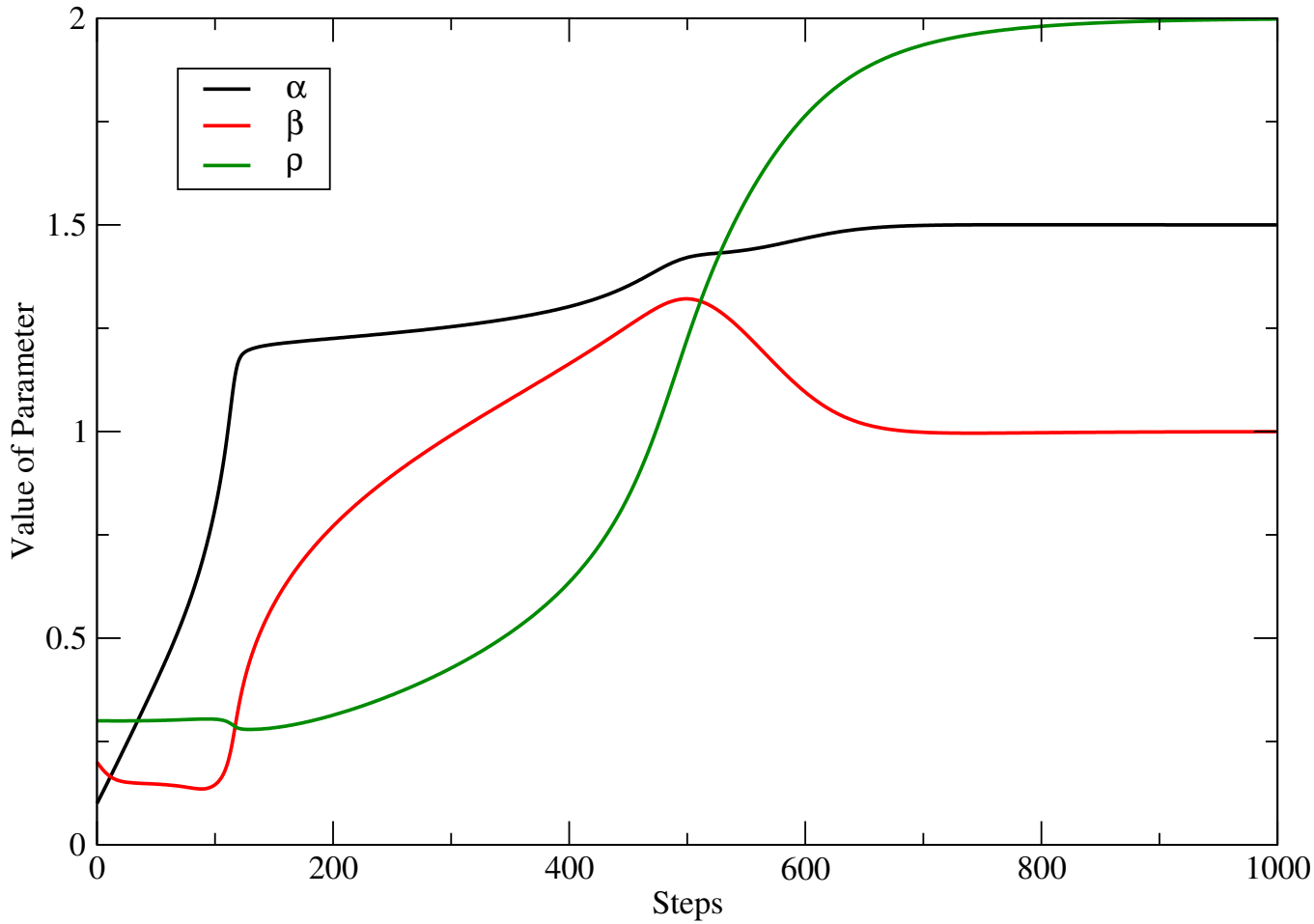


Replace the ill-posed problem by a family of neighboring well-posed problems.

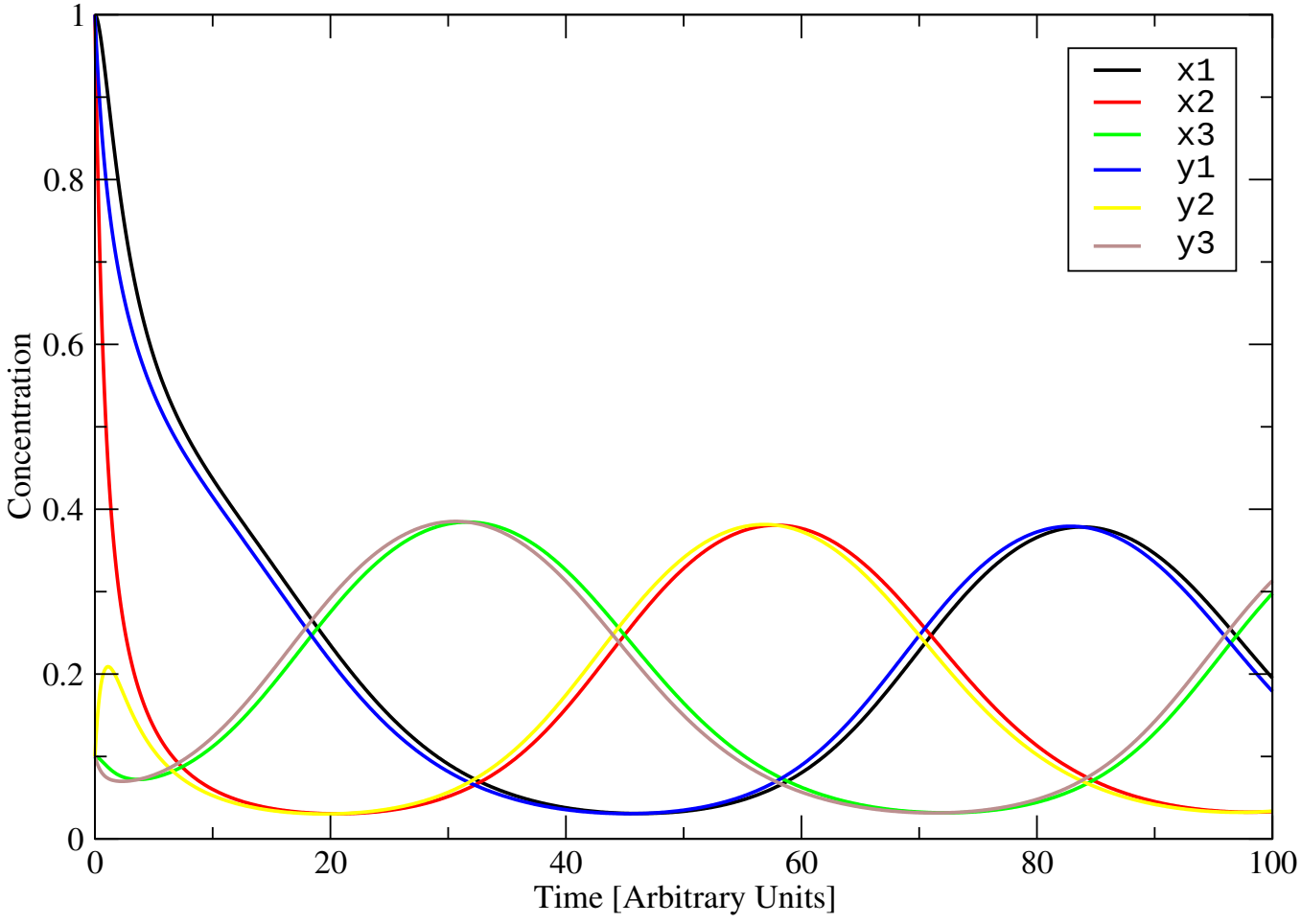
In other wordes:
Finde an approximation (Tikhonov, Landweber Regularization) to the true solution, that depends on the actual data in a stable way.

Parameter Optimization

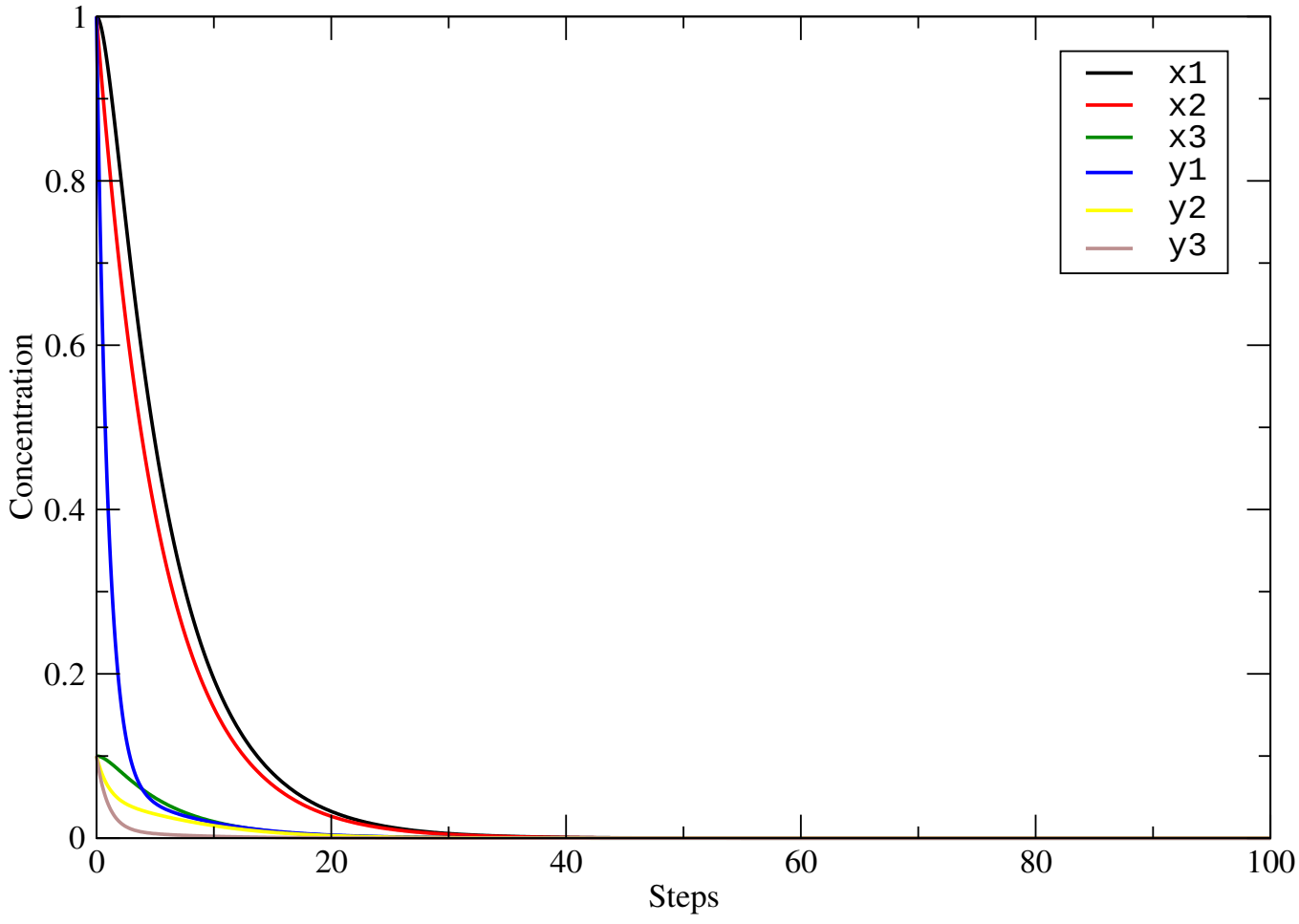
$$\dot{x}_i = \beta \cdot (y_i - x_i)$$
$$\dot{y}_i = \alpha \cdot \frac{x_i}{1 + x_i + \rho \cdot x_{i-1}} - y_i$$



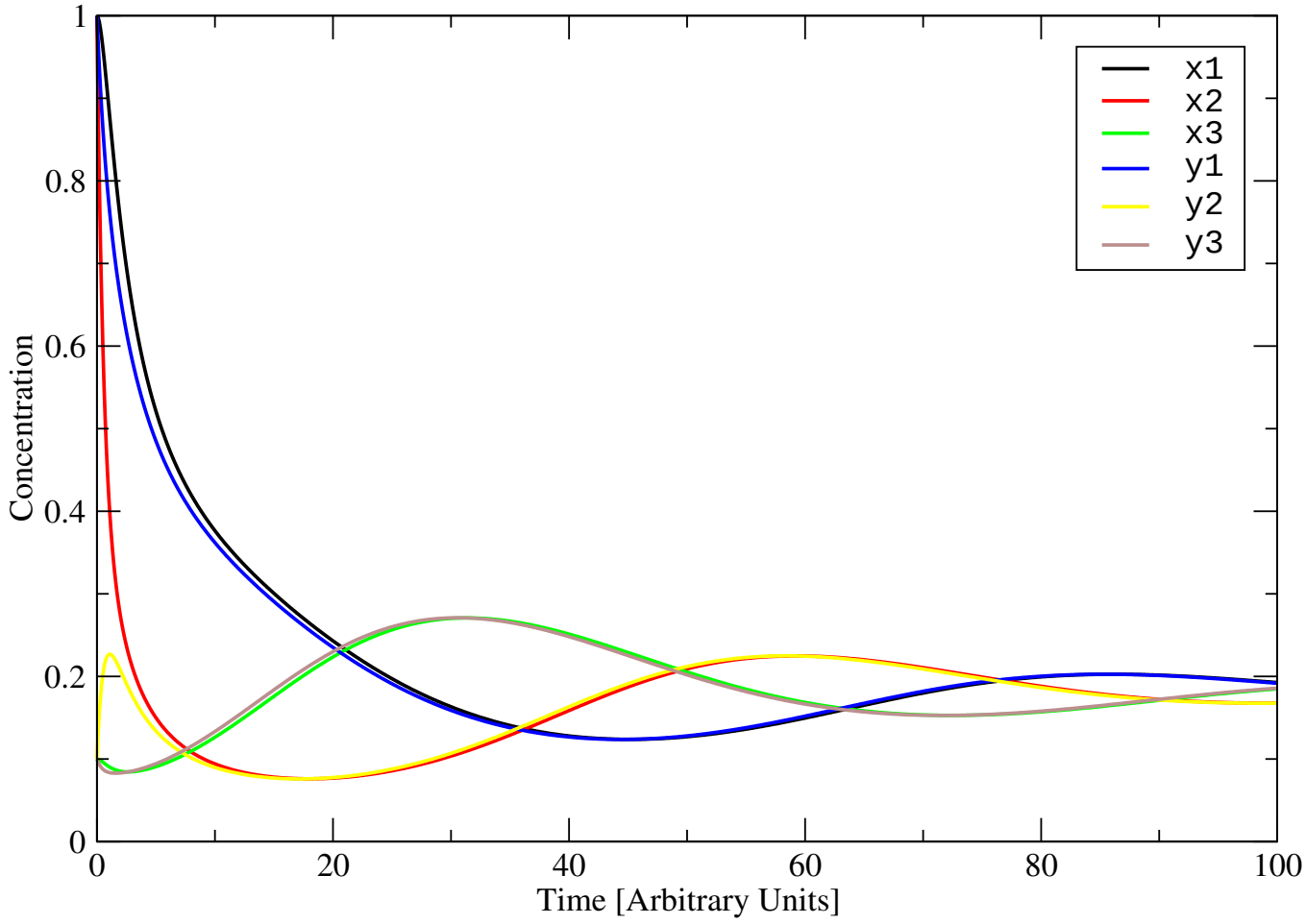
Desired Behavior



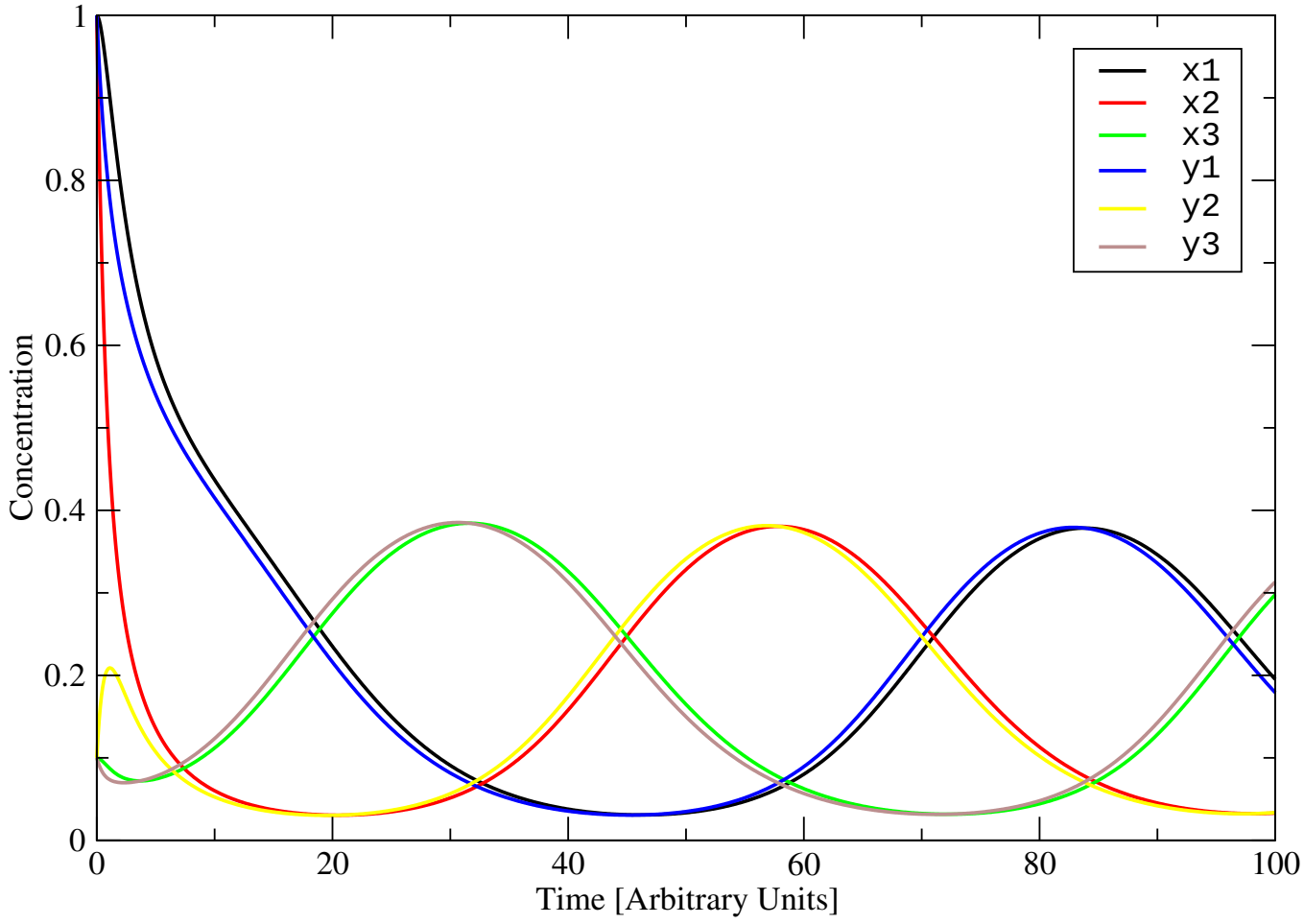
Start Parameters =: (



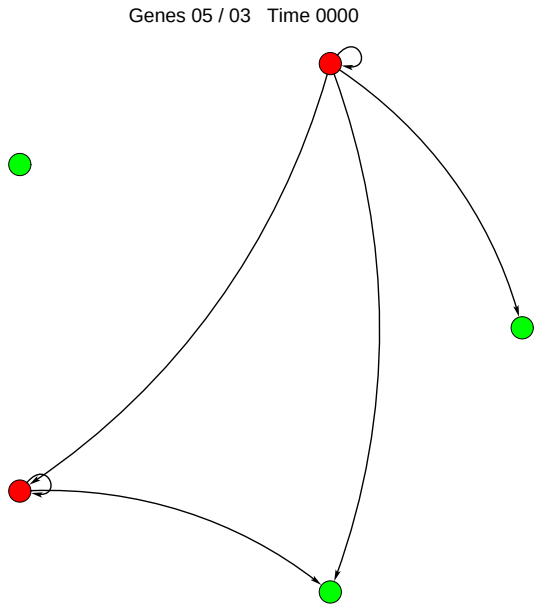
Somewhere in the Middle =:o

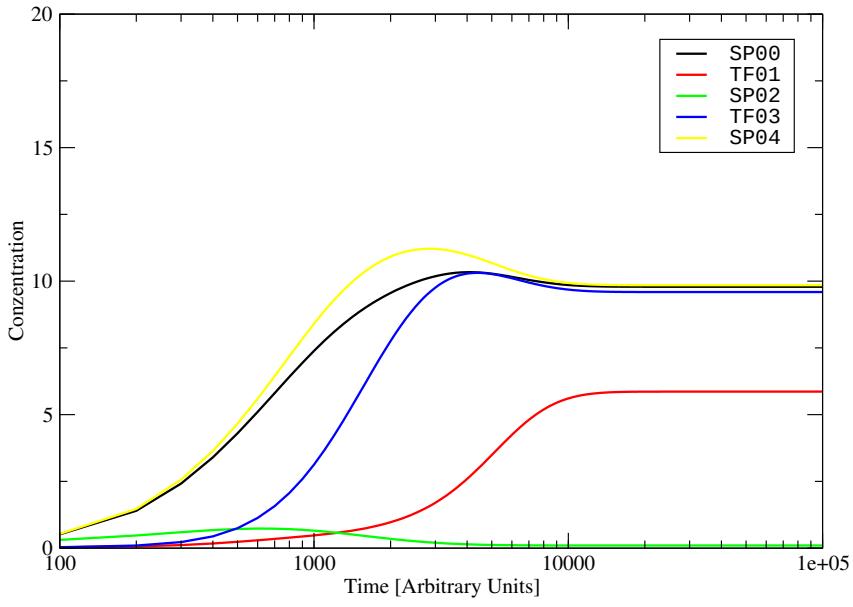


EXIT_SUCCESS =;)



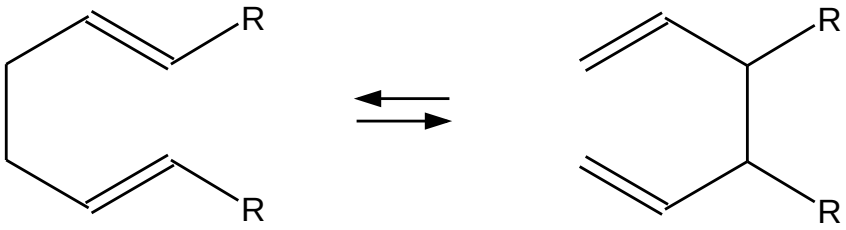
The GRN's Dynamics as Phenotype

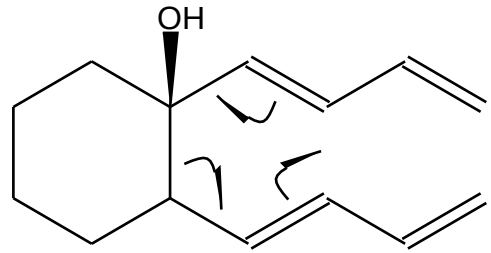




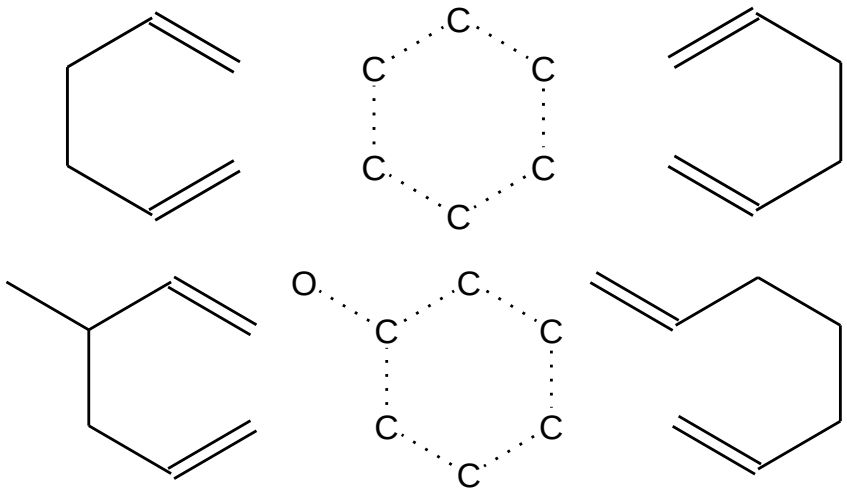
GraphReWrite

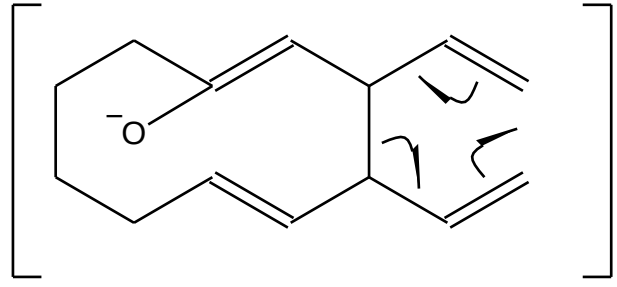
Cope Rearrangement

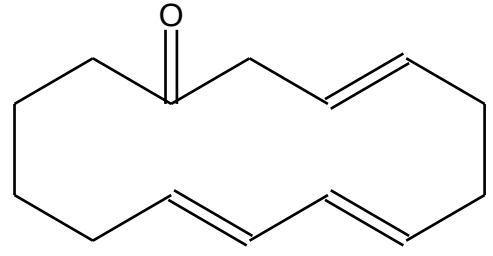




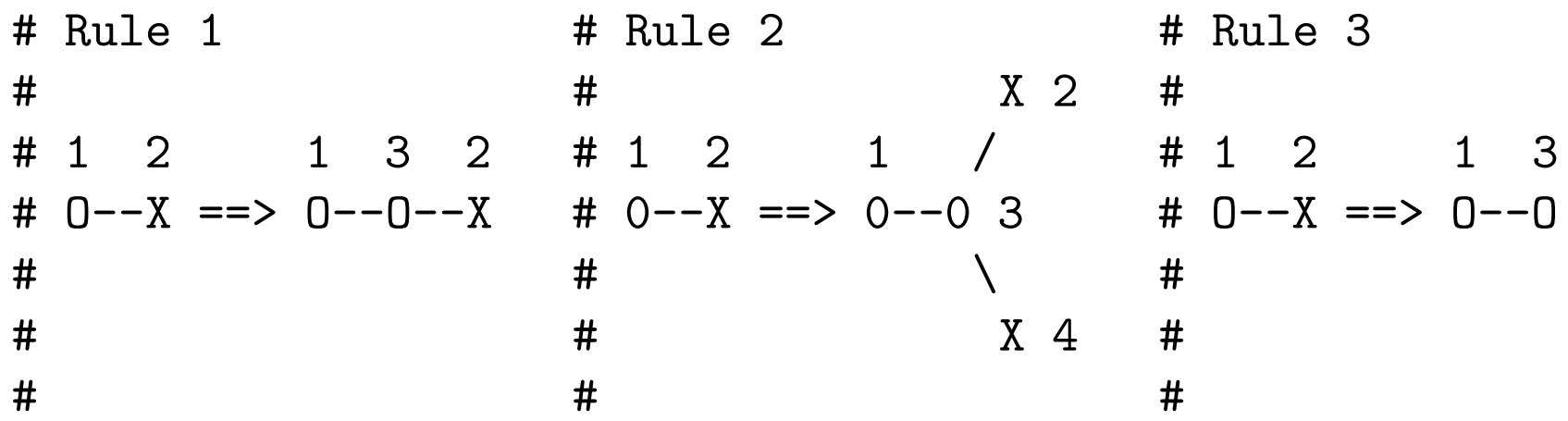
Rewrite Rules



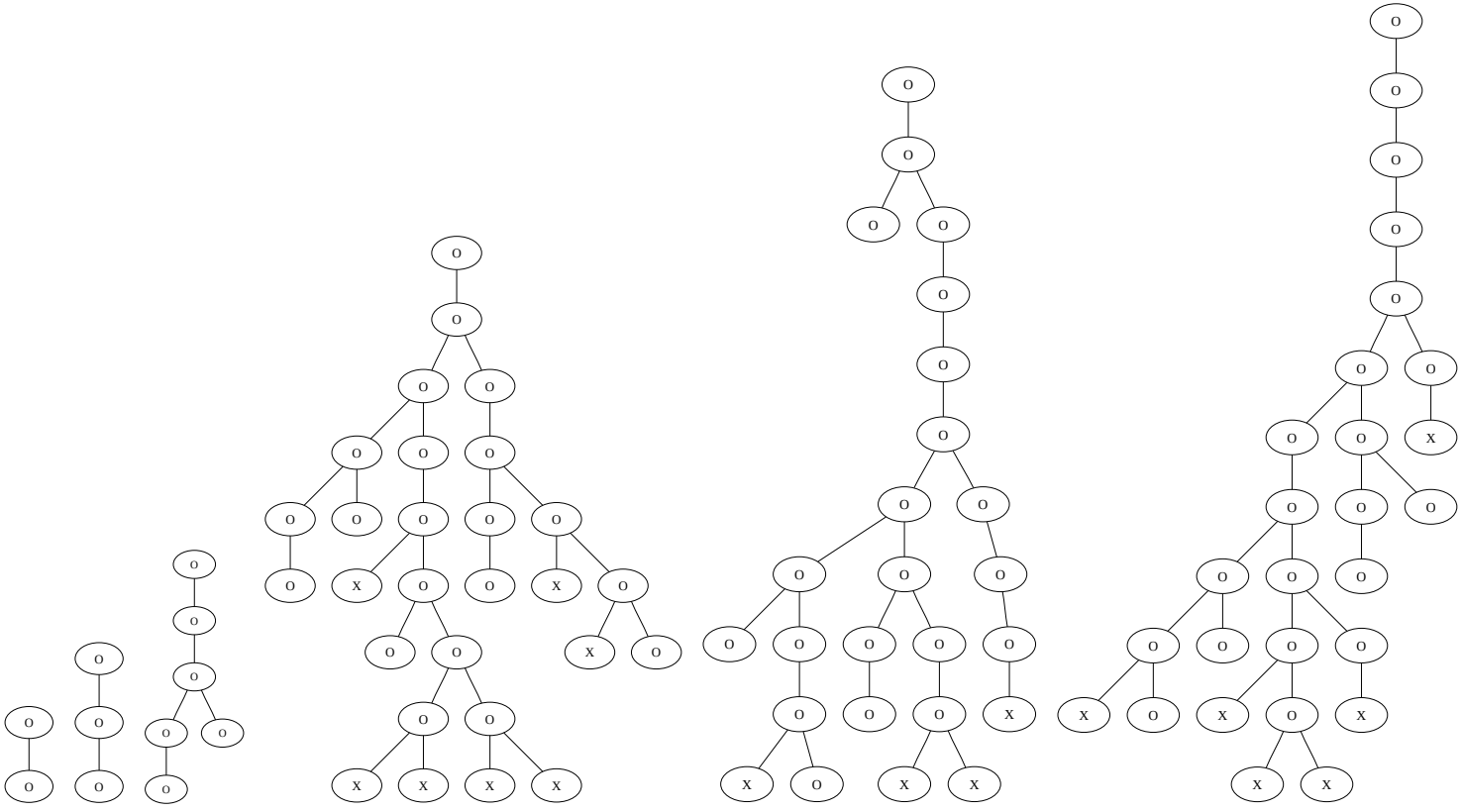




L-System Mimicry

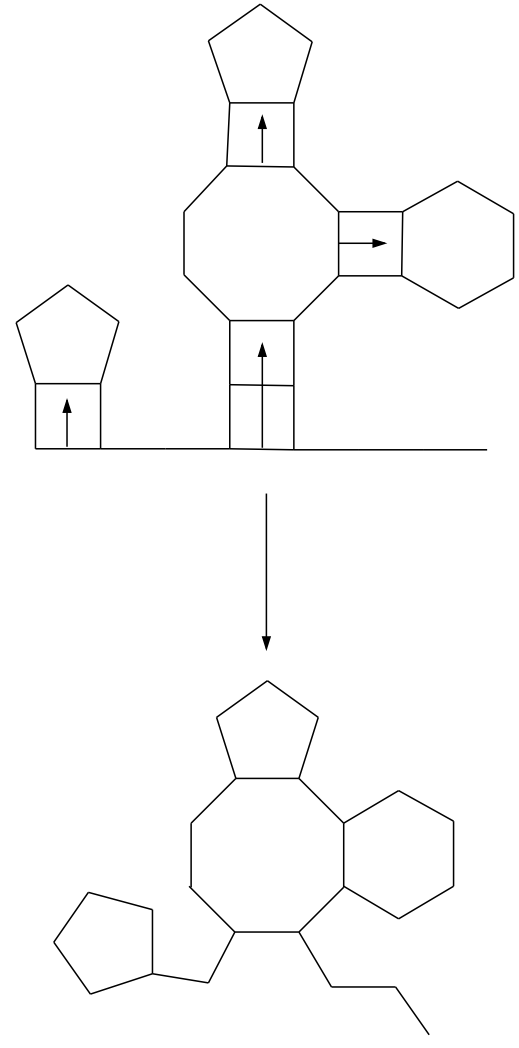


Grow your Phenotype

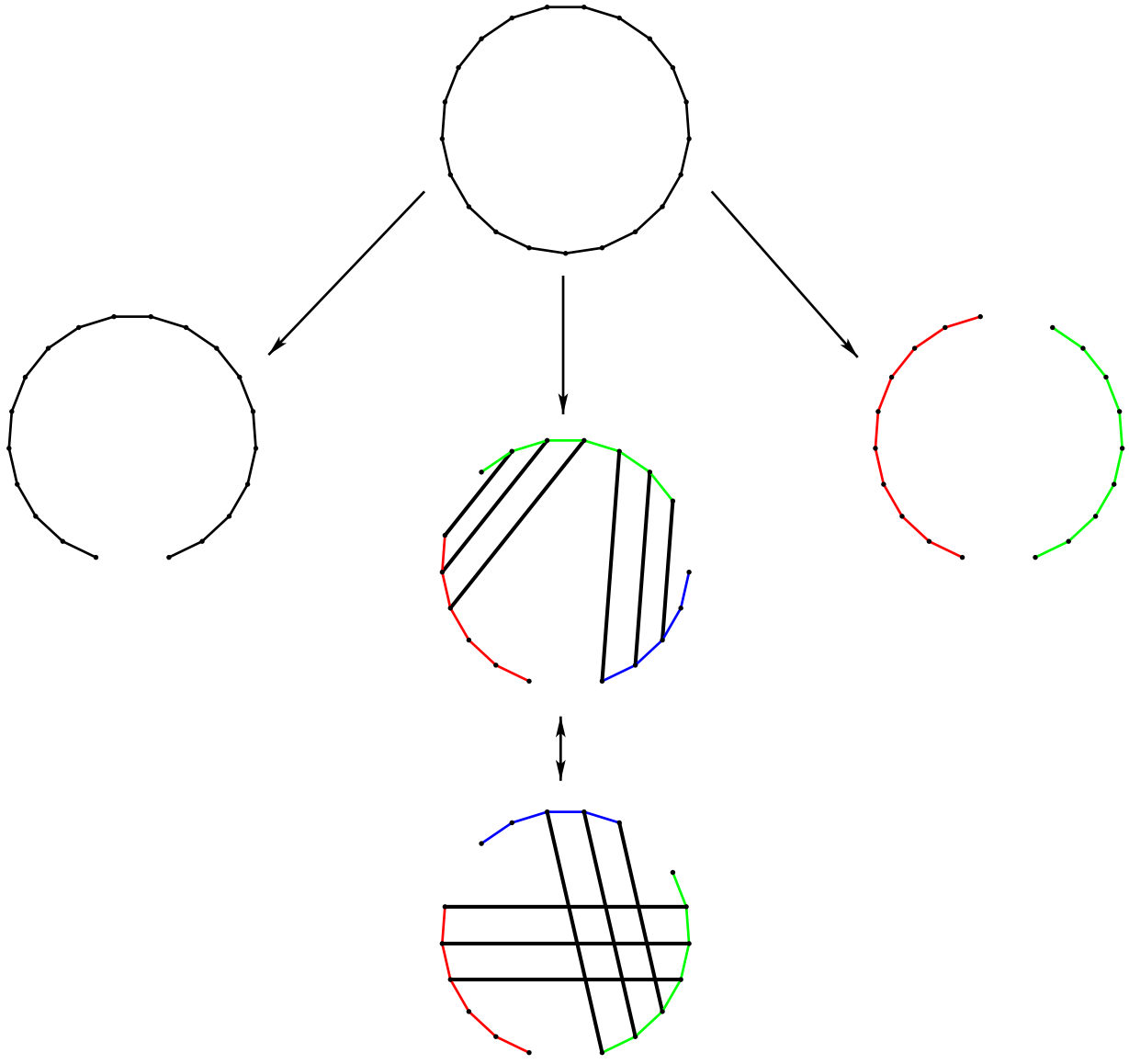


A Codec for GRW Rules

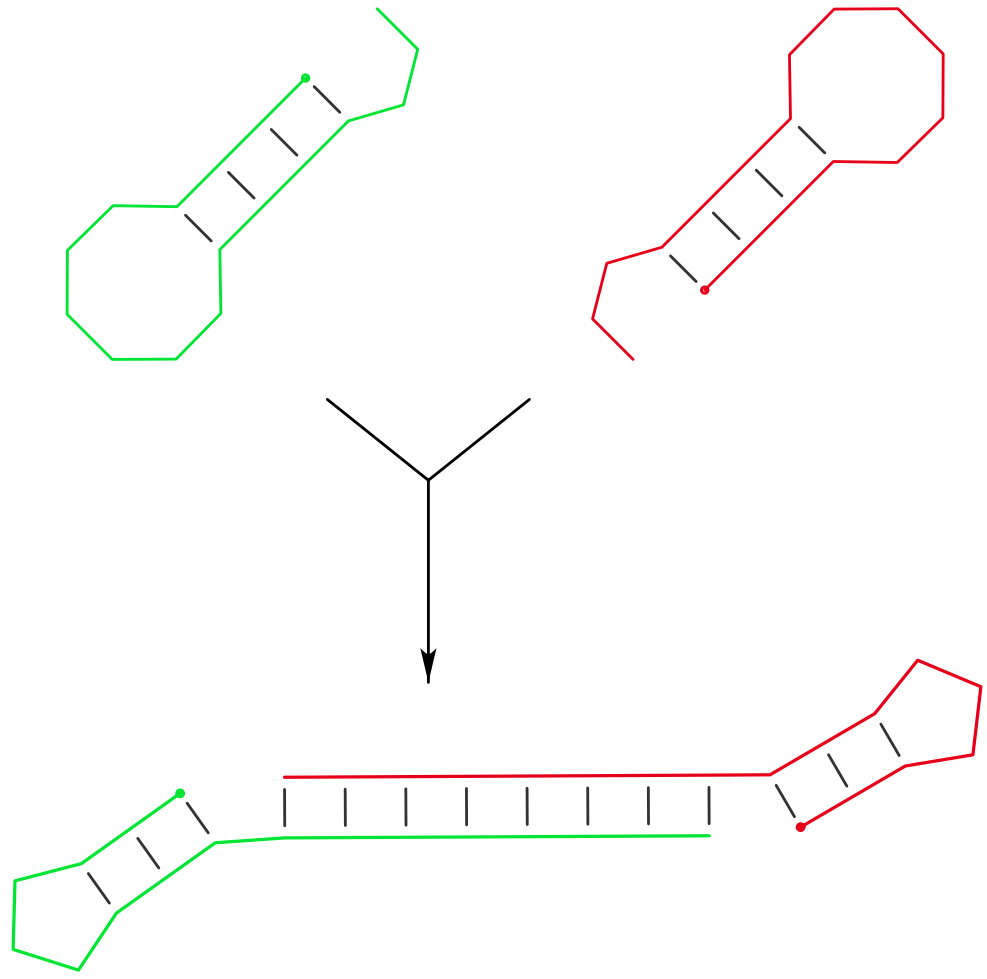
C1CCC2CCCCC2C1	1	11
C1CCCCCCC1	8	10
CCC1CCCCC1CC	17	9
CCCCC1CCCCC1	29	8
CCCC1CCCCC1C	36	7
CC1CCCC1	45	6
CC1CCCCCC1	73	5
C1CCCCC1	83	4
CC1CCCCC1C	97	3
CCC1CCCCC1	128	2
CCCCCCCCCC	9483	1



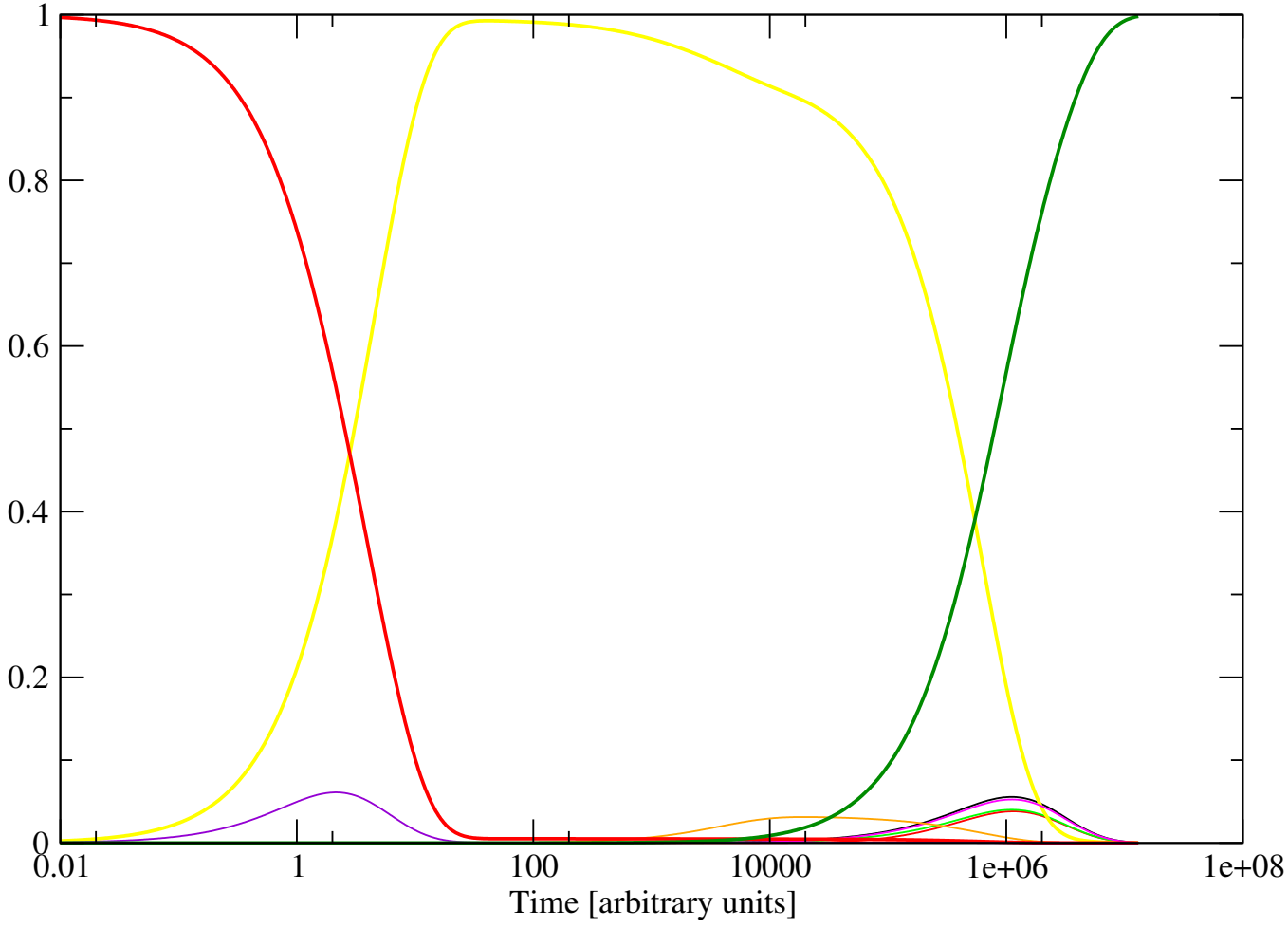
The Genealogy of Folding Variants



The CoFold Problem



CoFold Kinetics



THX to

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Lukas Endler (MiniCellSim)
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Coming up the Cofold-Movie
... =;)