

Running the matlab/simulink files:

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The files were generated with MATLAB R2015b.

Within each folder:

matlab

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- open the "run\_motif?.m" file in the matlab folder.
- click on the "run" button in matlab and eventually add the file to the path if a warning that the file is not included in the path should appear.
- after some time the graphical output should appear. A png-file is provided showing the graphical output.

The following data are generated (zero-, first-, and second order implementations of integral feedback):

- run\_motif2.m: exponential increase of k2 with time (Fig.5b)
- run\_motif3.m: hyperbolic increase of k2 with time (Fig.7c)
- run\_motif5.m: linear increase of k1 with time (Fig.3a)
- run\_motif8.m: linear increase of k2 with time (Fig.9a)

simulink:

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- open the .mdl file. The graphical user interphase appears.
- click on the "run" button.
- double-click the "Scope" in the .mdl file if results do not appear after the run. A png-file is provided showing the graphical output.

The following data are generated:

- "Fig3 motif5 calculations"-folder:
  - i) zero-, first-, and second order implementations of integral feedback in motif 5 when k1 perturbations increase exponentially (Fig. 3b).
  - ii) Second-order implementation of integral control in motif 5 and k1 perturbation increases hyperbolically with time (Fig. 3c, black curves).
- "Fig5 motif2 calculations"-folder:
  - i) zero-order implementation of integral control in motif 2 with k2 perturbation increasing hyperbolically (Fig. 5c, blue curves).
  - ii) zero-order implementation of integral control in motif 2 with k2 perturbation increasing linearly (Fig. 5a, blue curves).
- "Fig7 motif3 calculations"-folder:
  - i) first-order implementation of integral control in motif 3 with k2 perturbation increasing linearly (Fig. 7a, red curves).
  - ii) first-order implementation of integral control in motif 3 with k2 perturbation increasing exponentially (Fig. 7b, red curves).
  - iii) second-order implementation of integral control in motif 3 with k2 perturbation increasing exponentially (Fig. 7b, black curves).
- "Fig9 motif8 calculations"-folder:
  - i) first-order implementation of integral control in motif 8 with k1 perturbation increasing exponentially (Fig. 9b, red curves).
  - ii) first-order implementation of integral control in motif 8 with k1 perturbation increasing hyperbolically (Fig. 9c, red curves).

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