SUPPLEMENTARY MATERIAL: ESTIMATING TIPPING RISK FACTORS IN COMPLEX SYSTEMS WITH APPLICATION TO POWER OUTAGE DATA

PREPRINT SUPPLEMENT

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This pdf includes:

- Supplementary text
- Figure S1

Other supplementary materials for this manuscript include the following:

- Data and simulation codes can be found at `https://github.com/MartinHessler/Disentangling_Tipping_Types`.
- The open-source package *antiCPy* is available at `https://github.com/MartinHessler/antiCPy` under a *GNU General Public License v3.0* and documented at `https://anticpy.readthedocs.io`.

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1 Supplementary Information Text

Appendix A: Synthetic examples without time lag

In figure S1 the analysis results of the synthetic data is presented again, but the estimates are not related to the last time window point as in figure 1 of the main article. Instead the values are assigned to the mid points in time of each window to show that the estimates match the original model values marked by the green solid lines rather well in the Markov examples of figure S1 (a,d).

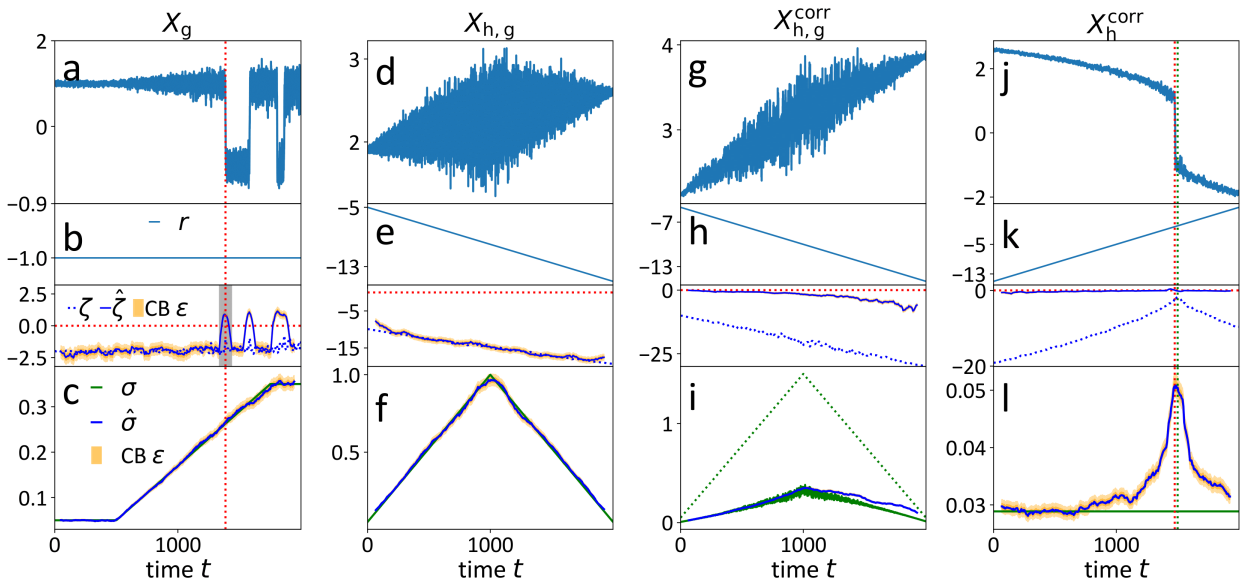

Figure S1: The figures show the BL-estimation results of the synthetic data examples of the main article, but instead of assigning the estimates of the method with the end point (cf. main article, figure 1), the estimates are assigned to the mid point of each window. This confirms the statement of rather accurate matching estimates with the real values in the Markov examples of figure S1 (a,d). Nevertheless, comparing the drift slope estimates in the correlated examples (h,k) to the analytical values (blue dotted lines) reveals that Non-Markovianity can lead to significantly biased estimates as expected when keeping in mind the model assumptions.