


Supplementary Materials: Incremental parameter estimation under rank-deficient measurement conditions – Supplementary information

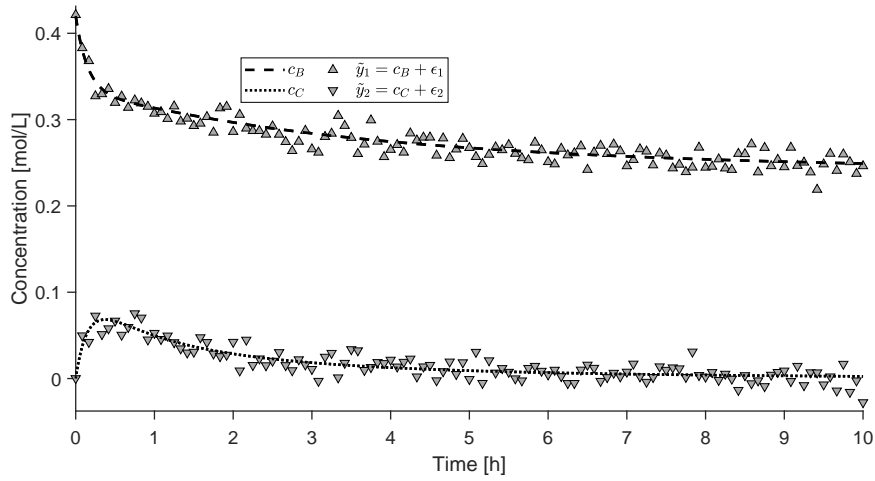
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1 A. Efficient Model Identification (EMI) package

2 The attached Zip file includes all code to reproduce our results with Matlab R2017b.

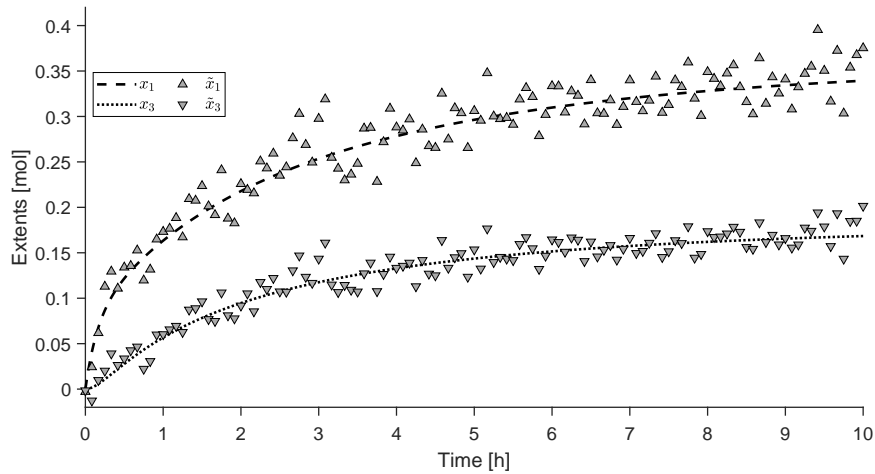
3 B. Simulation study – Additional results

4 B.1. Scenario B



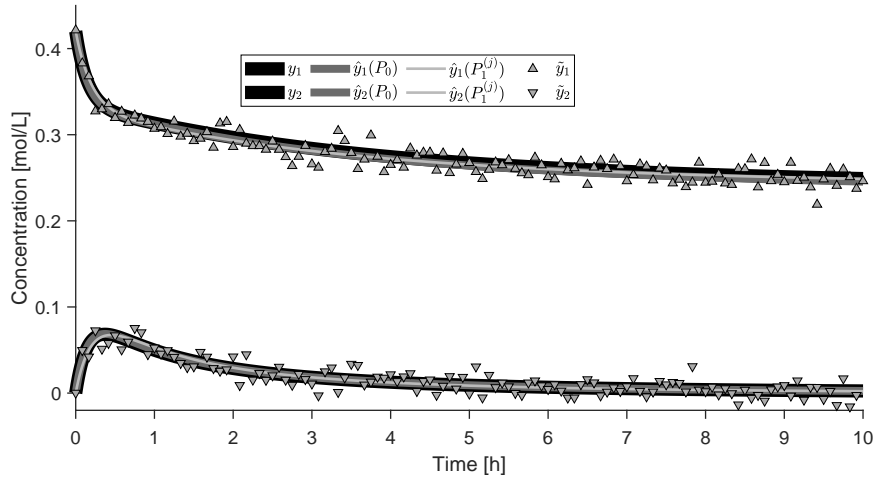
{fig:scenarioB}

Figure S1. Scenario B – Simulation. Noise-free and noisy measurements as a function of time.



{fig:scenarioB}

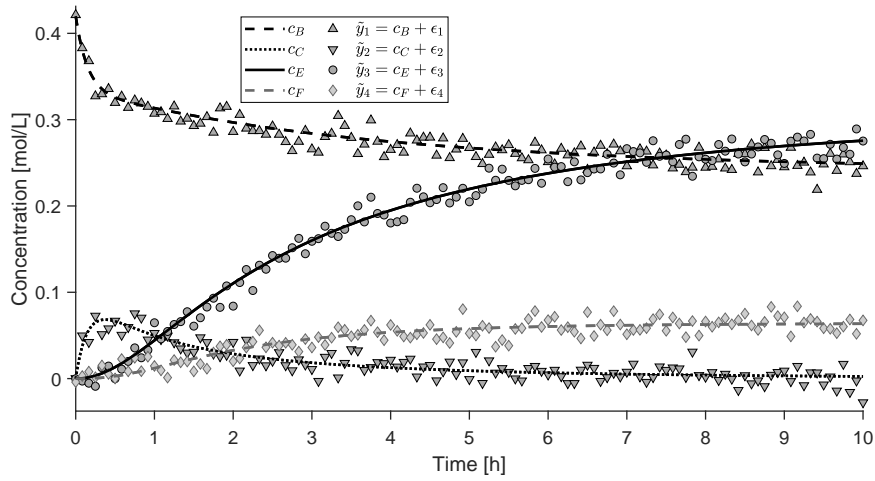
Figure S2. Scenario B – Extent computation. Observable extents (x_1, x_3) and their computed equivalents (\tilde{x}_1, \tilde{x}_3).



{fig:scenarioB}

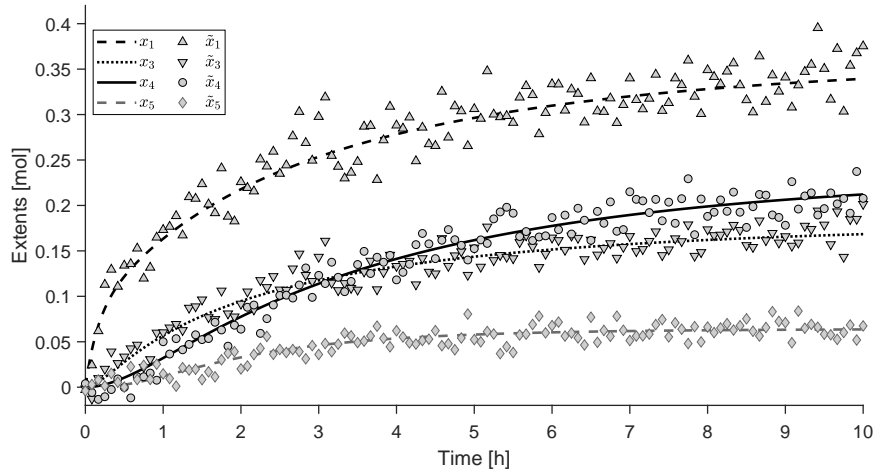
Figure S3. Scenario B – Parameter estimation. Measured concentrations and simulated profiles obtained with (i) true parameters, (ii) simultaneous parameter estimation P_0 , and (iii) incremental parameter estimation $P_1^{(1)}$ and $P_1^{(2)}$. The produced simulation results exhibit strong overlap, meaning that the identified models closely approximate the ground truth model.

5 B.2. Scenario C



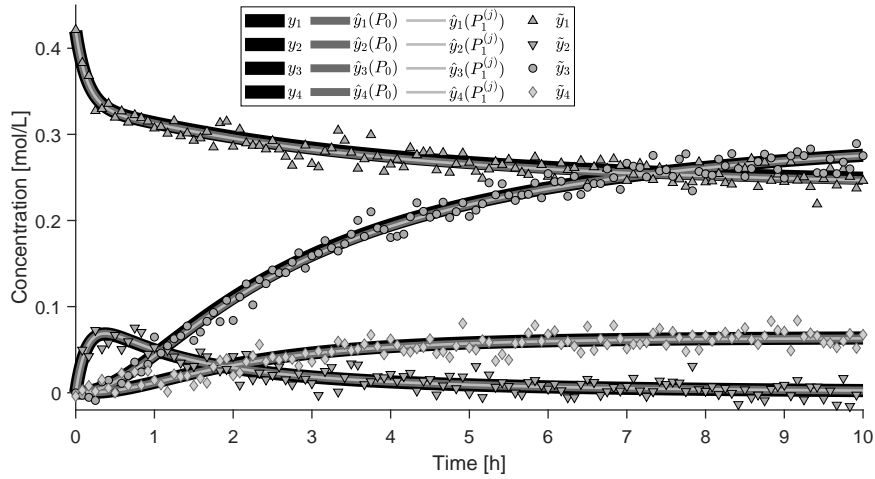
{fig:scenarioC}

Figure S4. Scenario C – Simulation. Noise-free and noisy measurements as a function of time.



{fig:scenarioC

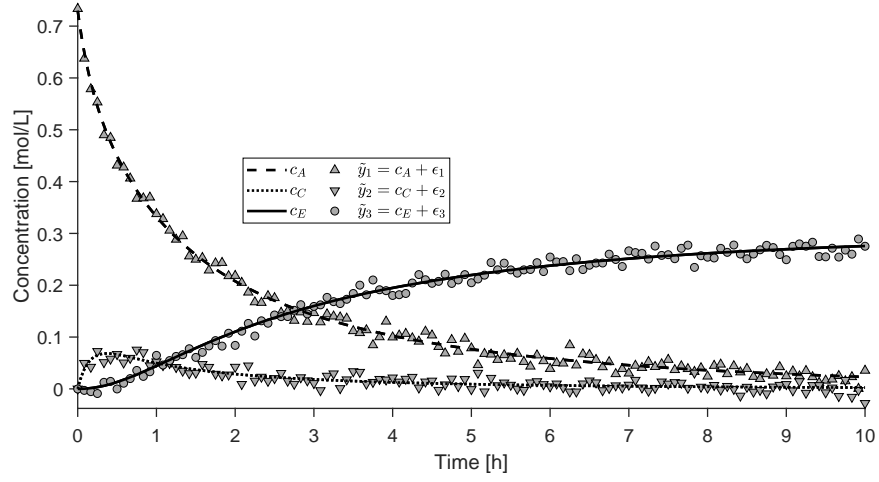
Figure S5. Scenario C – Extent computation. Observable extents (x_1, x_3, x_4, x_5) and their computed equivalents ($\tilde{x}_1, \tilde{x}_3, \tilde{x}_4, \tilde{x}_5$).



{fig:scenarioC

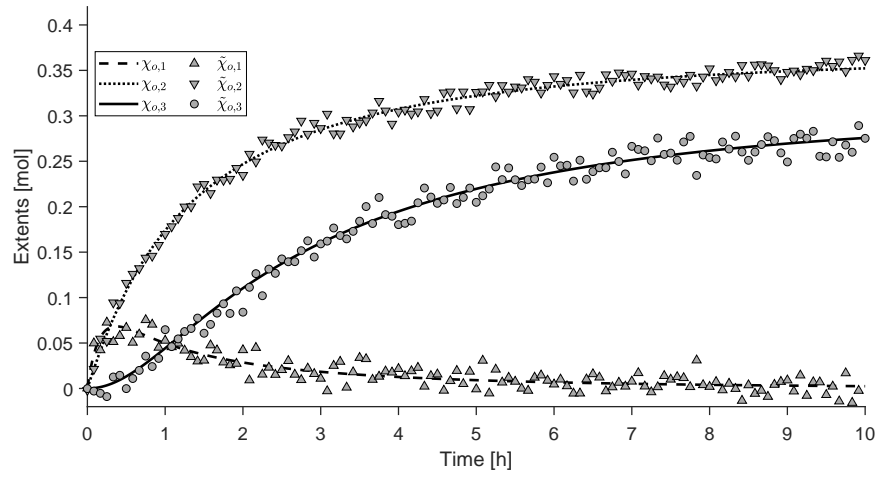
Figure S6. Scenario C – Parameter estimation. Measured concentrations and simulated profiles obtained with (i) true parameters, (ii) simultaneous parameter estimation P_0 , and (iii) incremental parameter estimation $P_1^{(1)}$ and $P_1^{(2)}$. The produced simulation results exhibit strong overlap, meaning that the identified models closely approximate the ground truth model.

6 *B.3. Scenario D*



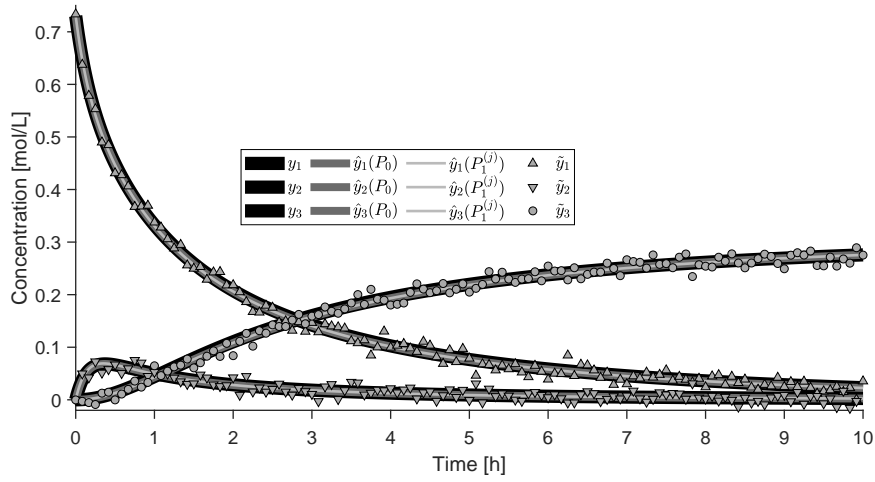
{fig:scenarioD}

Figure S7. Scenario D – Simulation. Noise-free and noisy measurements as a function of time.



{fig:scenarioD}

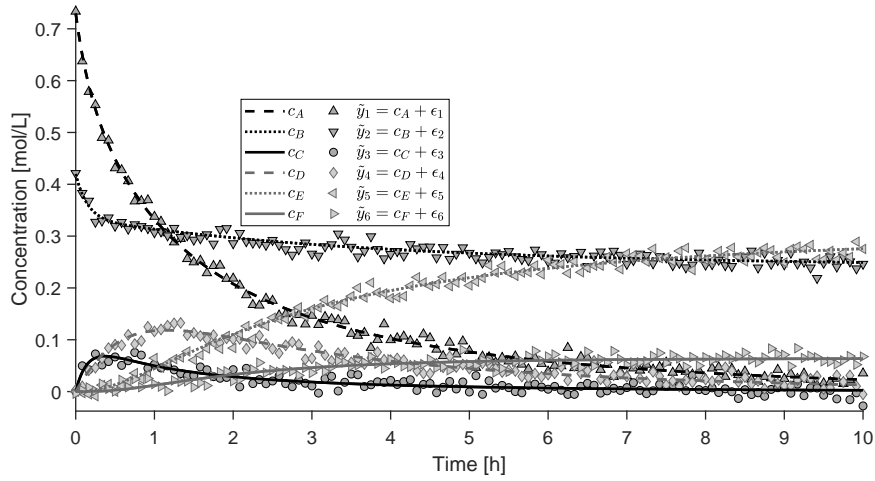
Figure S8. Scenario D – Extent computation. Observable extent directions ($\chi_{o,1}$, $\chi_{o,2}$, $\chi_{o,3}$) and their computed equivalents ($\tilde{\chi}_{o,1}$, $\tilde{\chi}_{o,2}$, $\tilde{\chi}_{o,3}$).



{fig:scenarioD}

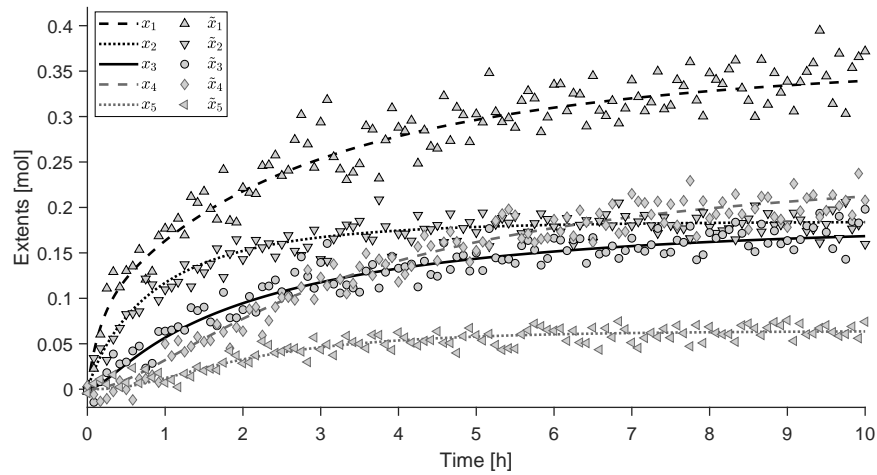
Figure S9. Scenario D – Parameter estimation. Measured concentrations and simulated profiles obtained with (i) true parameters, (ii) simultaneous parameter estimation P_0 , and (iii) incremental parameter estimation $P_1^{(1)}$ and $P_1^{(2)}$. The produced simulation results exhibit strong overlap, meaning that the identified models closely approximate the ground truth model.

7 B.4. Scenario E



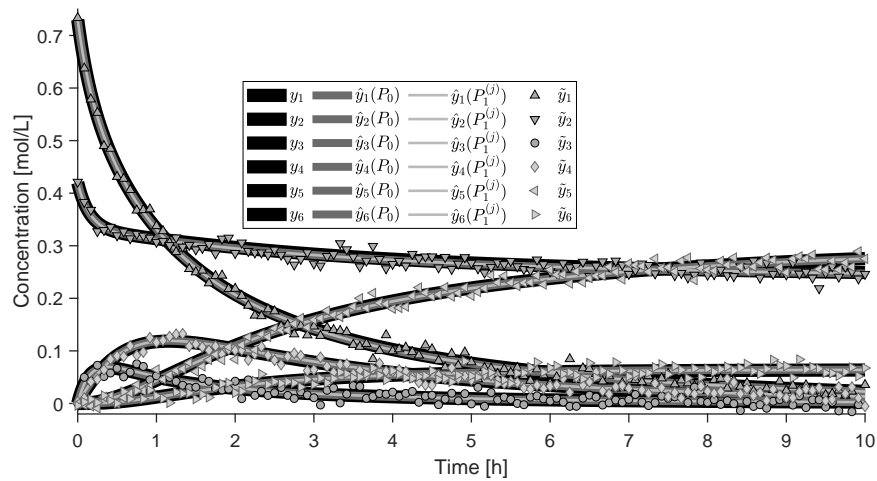
{fig:scenarioE}

Figure S10. Scenario E – Simulation. Noise-free and noisy measurements as a function of time.



{fig:scenarioD}

Figure S11. Scenario E – Extent computation. Observable extents (x_1, x_3) and observable extent direction (χ_o) and their computed equivalents ($\tilde{x}_1, \tilde{x}_3, \tilde{\chi}_o$).



{fig:scenarioE}

Figure S12. Scenario E – Parameter estimation. Measured concentrations and simulated profiles obtained with (i) true parameters, (ii) simultaneous parameter estimation P_0 , and (iii) incremental parameter estimation $P_1^{(1)}$ and $P_1^{(2)}$. The produced simulation results exhibit strong overlap, meaning that the identified models closely approximate the ground truth model.