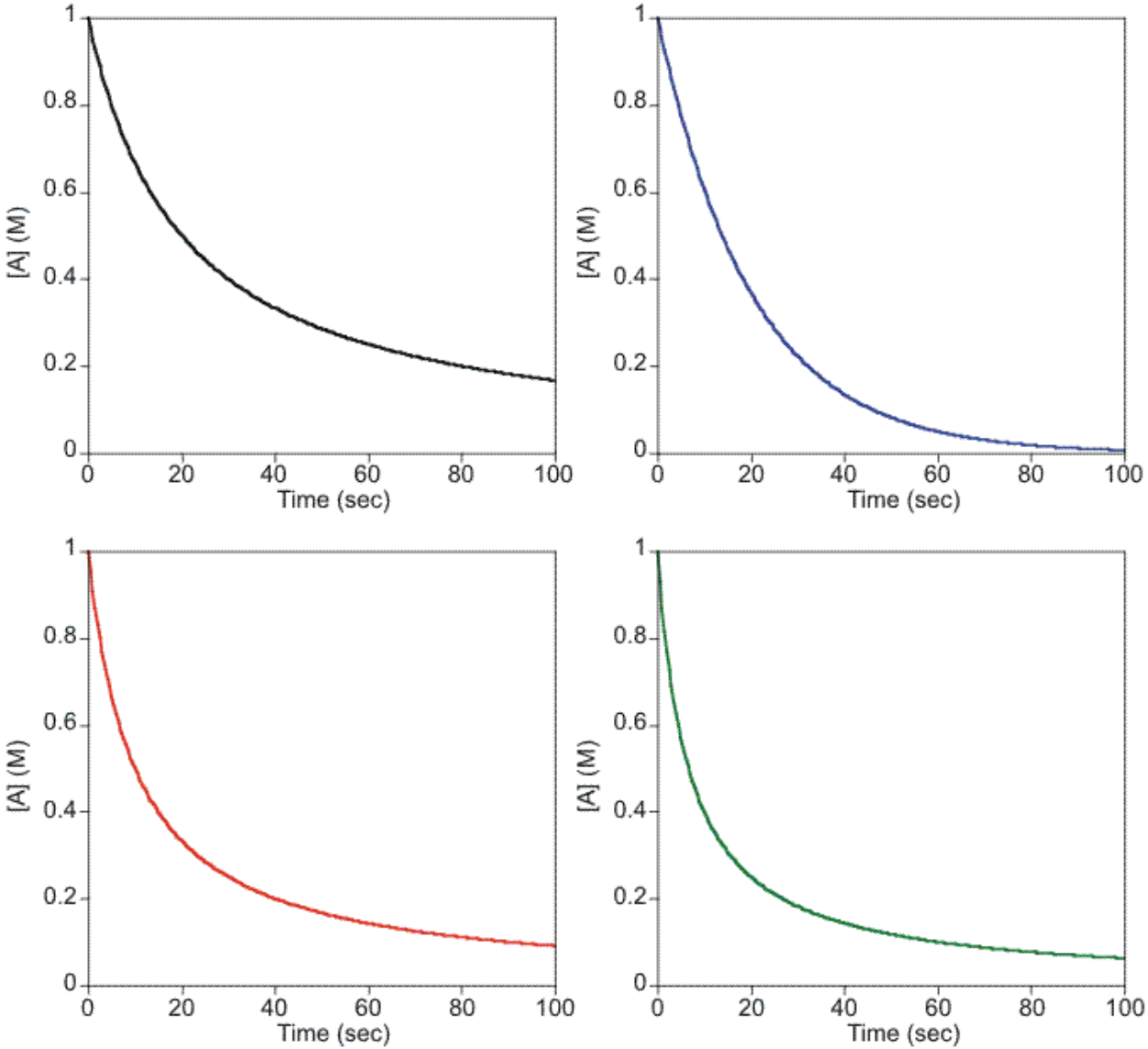
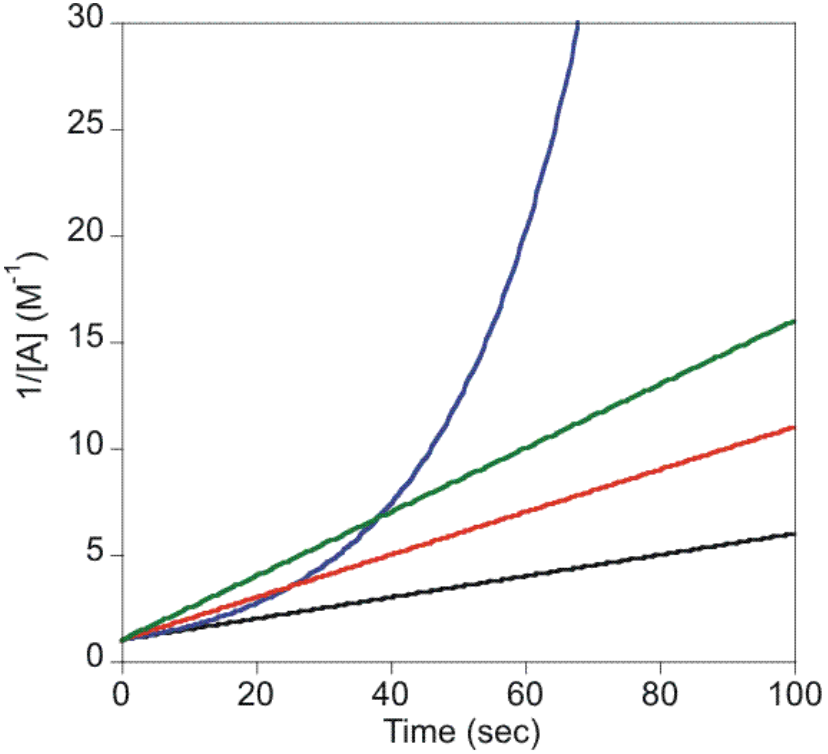
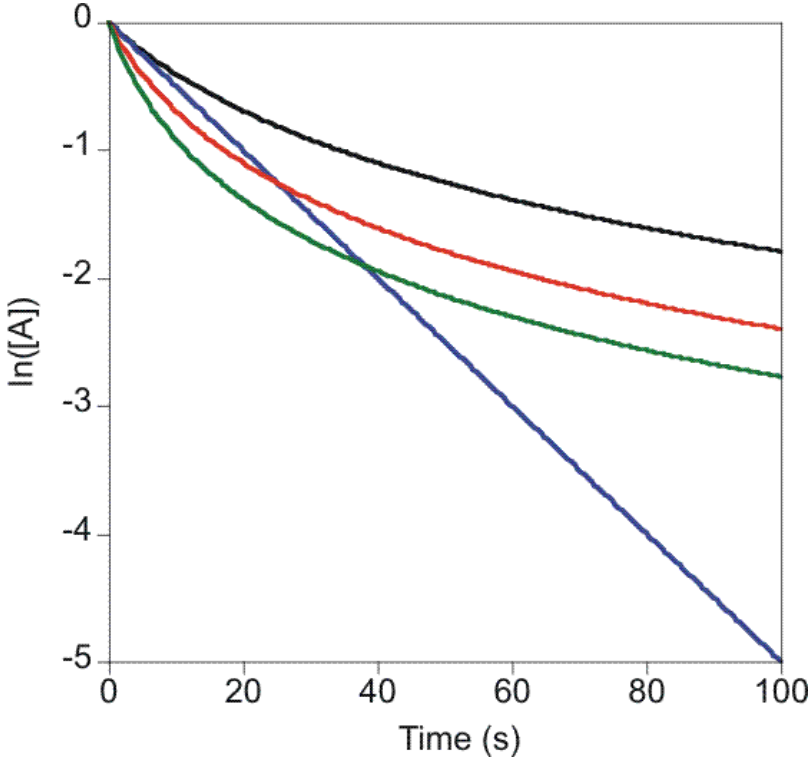
First and Second-Order Kinetic Data



Which plots are 1st order, and which are 2nd?

First and Second-Order Kinetic Data





$$\frac{1}{[\mathrm{A}]_t} = \frac{1}{[\mathrm{A}]_0} + kt$$

(2nd order)

$$\ln[A]_t = \ln[A]_0 - kt$$

(1st order)

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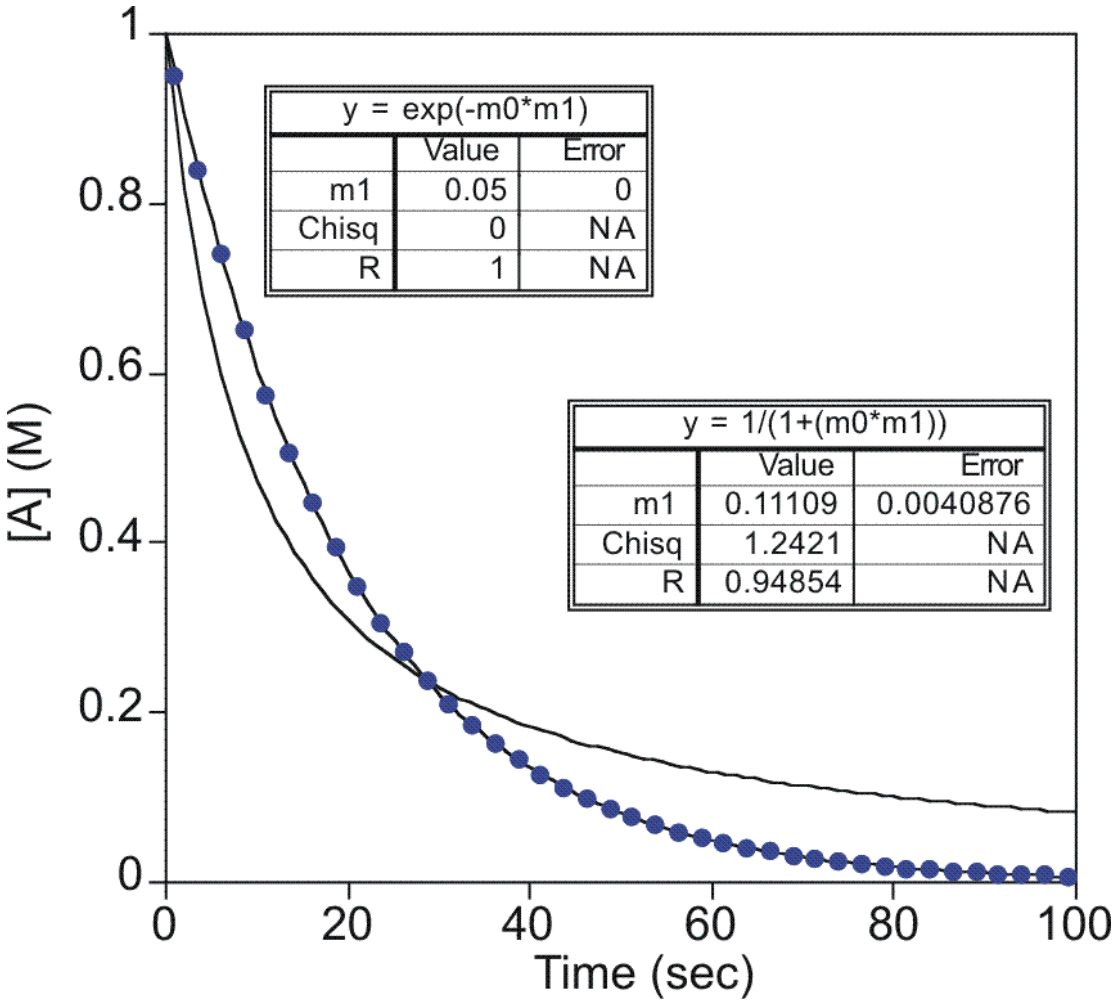


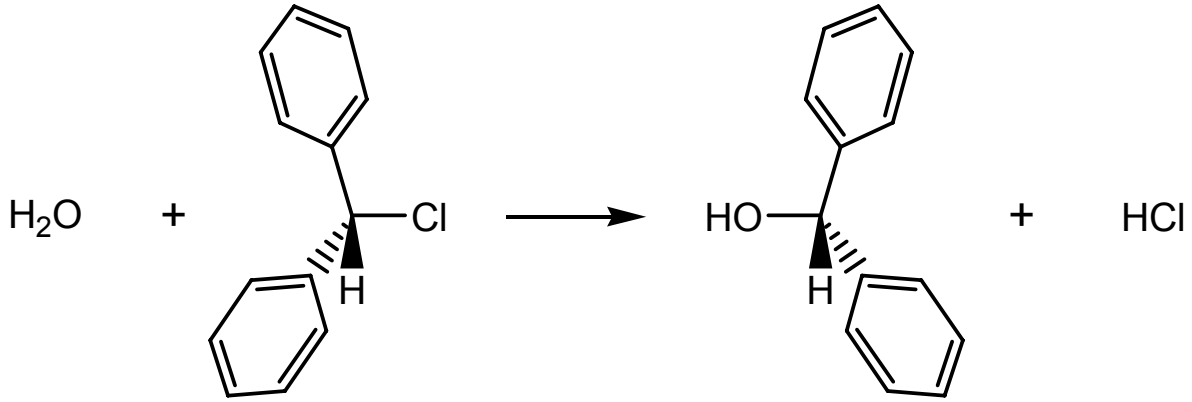
Direct fitting of data to integrated rate law also works.

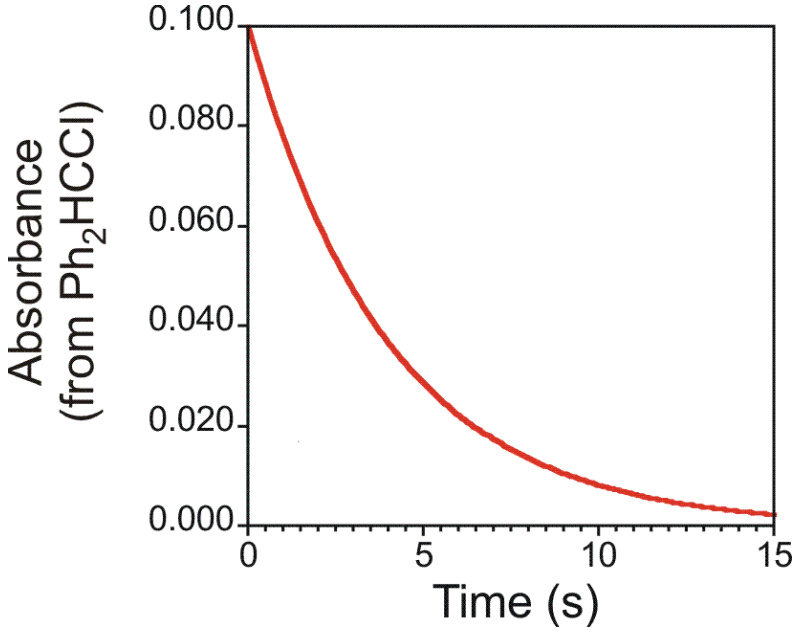
First and Second-Order Kinetic Data

Questions to answer on your own:

- If there is background signal present (i.e., $[A]_t = Y_t - Y_\infty$, and $[A]_0 = Y_0 - Y_\infty$), what does the second-order rate expression look like?
- What is the half-life for a second order reaction?

Pseudo First-Order Kinetic Data

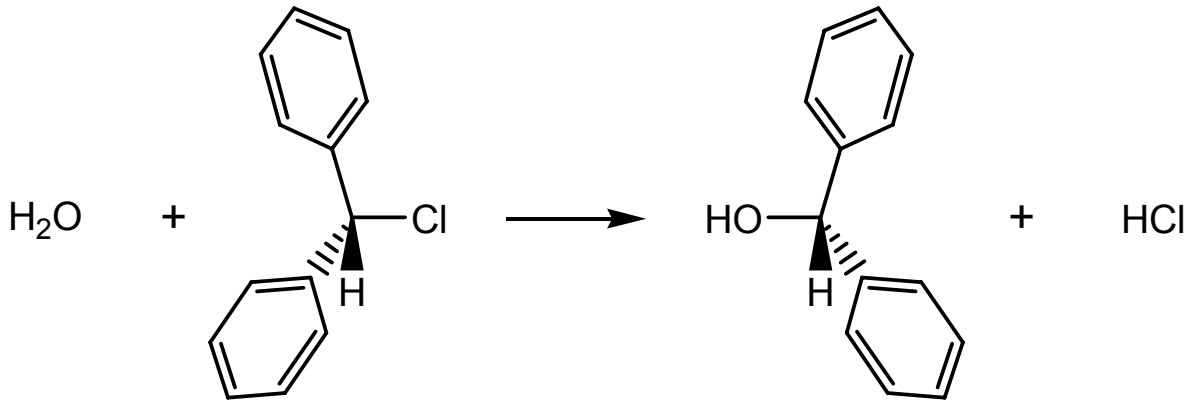


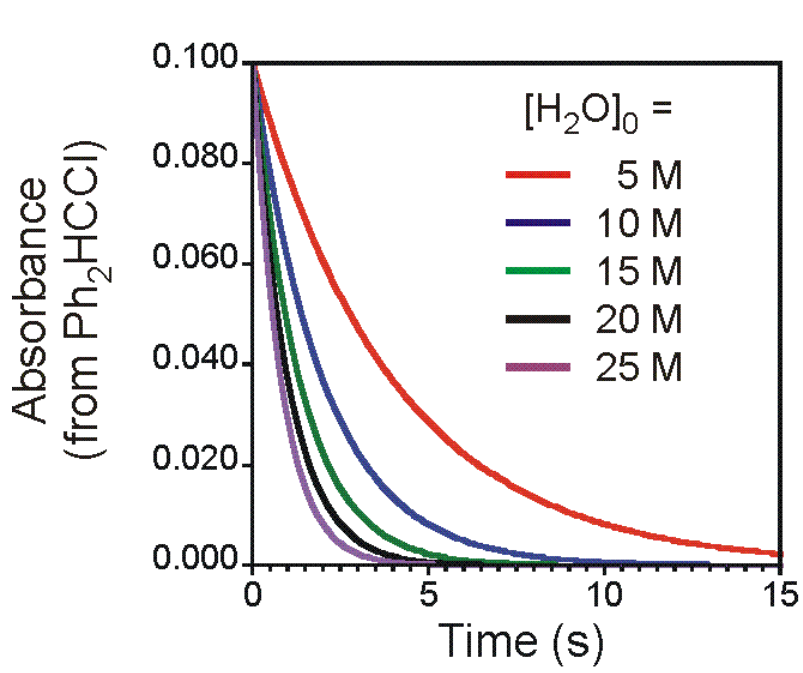


Run in excess H_2O, fits 1st order

$$[A]_t = [A]_0 e^{-k_{obs}t}$$

Pseudo First-Order Kinetic Data





each curve
gives one k_{obs}