

Homework I:

(use MS EXCEL in all tasks, copy each task in separate spreadsheet and solve)

1. Plot time dependency of A, B, and C for first-order reaction $A \rightarrow 2B+C$. Integral equation for A is $C=C_0 \exp(-kt)$ where $C_0=0.025 \text{ mol l}^{-1}$, $k=0.125 \text{ min}^{-1}$. Evaluate half-time and third-time of the reaction.
2. The half-time of tritium is 13.6years.
 - a) Calculate a rate constant for decomposition of tritium. Assume a first-order reaction.
 - b) How long will 99.99% of the tritium disappear?
 - c) Plot time dependency of both the tritium concentration and the rate of reaction.
3. A first-order polymerization reaction is being run in a batch reactor. A concentration of 0.007 mol/liter of monomer is loaded into the reactor, and then a catalyst is added to initiate the reaction. Experiments show that the reaction is 30% complete in 10 minutes.
 - a) Calculate rate constant.
 - b) Calculate half-time.
 - c) How long will it take for the reaction to be 90% complete?
 - d) How would the time in c) change if you increased the concentration in the reactor to 0.16 mol/liter?
 - e) Plot concentration vs. time.
 - f) Repeat it all for a second-order reaction.
4. Reproduce the Example 3.A: „Fitting Data to Mono`s Law” using MS EXCEL.
I.e. see pp. 103-110 in book: R.I. Massesl: „Chemical Kinetics and Catalysis”, read the text, check the values, and reproduce plots (using MS EXCEL) Figs:3.A.1, 3.A.2, 3.A.3, 3.A.4, and 3.A.5.

The result (i.e. *.xls files send as *.zip file to teacher via E/mail).