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Article Abstract: We discuss the need for devoting time in differential equations courses to modelling and the completion of the modelling process with efforts to estimate the parameters in the models using data. We estimate the parameters present in several differential equation models of chemical reactions of order n, where n = 0, 1, 2, and apply more general parameter estimation approaches to an optimization problem involving the production chemical reaction A->B->C.

The paper presents an overviews of chemical kinetics of order 0, 1, and 2 with examples and data from the chemistry textbook literature. Spreadsheet and Mathematica approaches to estimate parameters are offered.