CST8233: Lab #8

Non-Linear regression

Objective

The objective of this lab is to familiarize the student with the theory topics covered in Week 9. Mainly, this lab focuses on **Non-Linear Regression**

Earning

There is no mark for this lab. However, each student should finish the lab's requirements within the lab session and demonstrate the working code to the instructor.

Discussion

The progress of a homogeneous chemical reaction is considered, and it is desired to evaluate the rate constant and the order of the reaction. The rate law expression for the reaction is known to follow the power function form:

$$-r = k\,C^n$$

Use the data provided in the table below to obtain k and n.

Table Chemical kinetics.

C_A (gmol/l)	4	2.25	1.45	1.0	0.65	0.25	0.006
$-r_A$ (gmol/l·s)	0.398	0.298	0.238	0.198	0.158	0.098	0.048

Write a C/C++ program that finds the model of progress of that chemical reaction.

Test your program:

$k = e^{-1.5711}$
$\quad = 0.20782$

$\qquad n = a_1$
$\qquad\quad = 0.31941$

the model of progress of that chemical reaction is
$\qquad -r = 0.20782 \times C^{0.31941}$