

Project #1

This assignment can be completed by team.

Total score: 100

Due date: 3/19

Objective: Learning Linear and Non-linear Model and Analysis of Uncertainty

Use cross validation to find the optimal order of polynomial

Problem description

A chemical engineer measured various properties of a gas and created a **training data set**. The measured properties include temperature, pressure, thermal conductivity, and sound velocity.

The **schema** of the data set is shown below:

Dataset(Tm, Pr, Th, Sv, Idx) where all of the attributes are type double. This data set will be available on the course page.

The chemical engineer wonders if there are any functional relationships between the measured physical properties (Tm, Pr, Th, Sv) and a chemical index, Idx.

Required activities

Develop the best **predictive models** for the data set and **write** a **brief report** in Word format that includes the following:

- (a) Your team name, member name(s), email addresses, and also the percentage contribution to this assignment if the assignment was completed by a team. (If a team cannot reach a consensus on the individual contribution, include the individual's claimed percent contribution with a brief description on the specific tasks performed.)
- (b) Choose either Python machine learning package or MATLAB (or both if you want). Give a **brief description** about the software or tool used for your modeling.
- (c) **Find** the best both **linear** and **non-linear models** in the standard math equation form using the methods and techniques discussed in class, **analyze** the uncertainty of your models, and write about (i) the **process** used for developing your models, (ii) **analyze** the **uncertainty** of each of your model, and (iii) a brief **justification** on why you think the model you have is the best (for each linear and non-linear models).
- (d) The source code, scripts written, or major GUI snapshots taken from the tool used.

Warning: Although code reuse from source codes available on the Internet is allowed, copying code from another student or team in this class is strictly prohibited. Any student or team violating this policy will receive a **ZERO** score for this assignment.

What and How to submit this assignment

Turn in **your report**. If you have more than one file, include all the files, and zip/compress them into one file by **your (or team's) name**. Then submit the **zipped** or **compressed file** to **Titanium**. For example, if your team name is "ABC", then the zip file name should be **ABC.zip**.

If the assignment was completed by team, only **ONE** of **your team members** needs to submit your team's work.

Grading policy

Your work will be graded based on the quality of your (or the team's) work as well as the completion of the requirements, the level of understanding on the problem and results, and the written report.