**Assignment 3: Regression & Optimisation**

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**Task 1:**

**Lines [15-30]**

Split data into target and features. Output the minimum and maximum heating and cooling loads from the dataset.

**Task 2:**

**Lines [33-46]**

Determine the correct size for the parameter vector using 8 for loops as there are 8 feature vectors.

**Lines [49-72]**

Calculate the estimated target vector using 8 for loops as there are 8 feature vectors.

**Task 3:**

**Lines [75-91]**

Comments included in the code.

**Task 4:**

**Lines [94-104]**

Comments included in the code.

**Task 5:**

**Lines [107-119]**

Comments included in the code.

**Task 6:**

**Lines [122-180]**

**[125]** Split the targets into heating and cooling targets.

**[133]** Run KFold for degrees 0, 1, 2.

**[140, 145]** Get the training and testing features and targets.

**[149]** Find the p0 for the heating load and cooling load.

**[153]** Calculate the predictions for the test data.

**[157]** Find the absolute difference between predictions and actual heating and cooling loads.

**[167]** Find the mean of the absolute difference for each degree.

**[171]** Find the best degree.

**Task 7:**

**Lines [182-201]**

**[183]** Calculate the best prediction using the full dataset and the best performing degree.

**[189-201]** Plot the predicted heating and cooling loads against their true loads.

Sample output:

*Minimum heating 6.01.*

*Maximum heating 43.1.*

*Minimum cooling 10.9.*

*Maximum cooling 48.03.*

*Mean absolute difference between estimated Heating Loads [9.1571166955076, 2.107095917822175, 0.8023662249294148]*

*Mean absolute difference between estimated Cooling Loads [8.588373873879465, 2.266495969478166, 1.5243382275612076]*

*Best Degree for Heating Loads: 2*

*Best Degree for Cooling Loads: 2*

Chart, scatter chart

Description automatically generated

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