

This project used Matlab Code to analyze the data using Raw Data Source which was stored in Excel format.

Includes:

1. Data Import & Extraction, Truncation and Preprocessing.
2. Data (statistical) analysis with: User-defined functions for calculation purpose, Array/table for storing variables/data.
3. Plotting in required format.
4. Results/Data Export to external sources (e.g. Excel).

The following graphs are for demonstration purpose:

- Original Data

Time(S)	Temp. (De Flow A	Flow B	Cond. (mS/cm)
0	35.232	0	12.001
4.352	35.05	0	12.001
9.352	35.232	0	12.023
14.352	35.232	0	11.913
19.352	35.232	0	11.833
24.352	35.232	0	11.731
29.352	35.232	0	11.626
34.352	35.232	0	11.516
39.352	35.232	0	11.406
44.352	35.232	0	11.292
49.352	35.232	0	11.178
54.352	35.232	0	11.039
59.352	35.232	0	10.921
64.352	35.232	0	10.828
69.352	35.232	0	10.718
74.352	35.232	0	10.579
79.352	35.232	0	10.486
84.352	35.232	0	10.398
89.352	35.413	0	10.317
94.352	35.232	0	10.25
99.352	35.232	0	10.165
104.352	35.413	0	10.073
109.352	35.413	0	9.988

- Data Extraction (from raw data source) and Truncation (cleaning)

```
Part1.m | part1_Q6.m | extractdata.m | analysis.m
1 - clc
2 - clear all
3 - %all runs pick 100 points
4 - %T=20C
5 - data1=xlsread('DATA_lab1E.xlsx',1,'A36:E172');
6 - t1=data1(:,1);%time(s)
7 - T1=data1(:,2);%Temp(C)
8 - At1=data1(:,5);%Conductivity(ms/cm)
9 - %initial condition and S.S. condition
10 - A01=xlsread('DATA_lab1E.xlsx',1,'E12');
11 - Ainf1=xlsread('DATA_lab1E.xlsx',1,'E381');
12 - %T=23C
13 - data2=xlsread('DATA_lab1E.xlsx',1,'A410:E503');
14 - t2=data2(:,1);%time(s)
15 - T2=data2(:,2);%Temp(C)
16 - At2=data2(:,5);%Conductivity(ms/cm)
17 - %initial condition and S.S. condition
18 - A02=xlsread('DATA_lab1E.xlsx',1,'E393');
19 - Ainf2=xlsread('DATA_lab1E.xlsx',1,'E772');
20 - %T=24.5C
21 - data3=xlsread('DATA_lab1E.xlsx',2,'A22:E272');
22 - t3=data3(:,1);%time(s)
23 - T3=data3(:,2);%Temp(C)
24 - At3=data3(:,5);%Conductivity(ms/cm)
25 - %initial condition and S.S. condition
```

- Data (Statistics) Analysis with clear explanation (documentation and comments)

```

1  clc
2  clear all
3  load lab1E_extracted_data.mat
4  %%matlab plot marker type
5  marker=[ 'o','+', 'x','s','d','w','v','>','<','h']
6  %% Data(statistical) Analysis
7  for i=1:12
8  %% Data Preprocessing
9  %% A0-- Initial condition
15  %% CA0
24  %% Ainf-- final S.S. value of At
29  %% CCinf (=CB0)
35  %% CA and x(conversion of A)
57  %% CBt( last point of truncated CB)
60  %% CA vs t
65  %% xA vs t
70
71  %% Differential method(Y_axis vs X_axis)
72  % pick delta t=25 s, means pick every 5 points from original data. ( original delta t=5s)
73  %% dx/dt(i.e. 'xdot')
97  %% Linear regression Y_axis=(dx/dt=xAdot=xdot) vs. X_axis=(CA0*(1-x)*(CB0/CA0-x))
124
125  %% Integral method (Y_axisl vs X_axisl)
126  %% define Y_axisl=ln((CB0/CA0-x)/(1-x))
140  %% linear regression ( X_axisl=t, Y_axisl=ln((CB0/CA0-x)/(1-x)))
183  end
184

```

- Plotting with required format:





