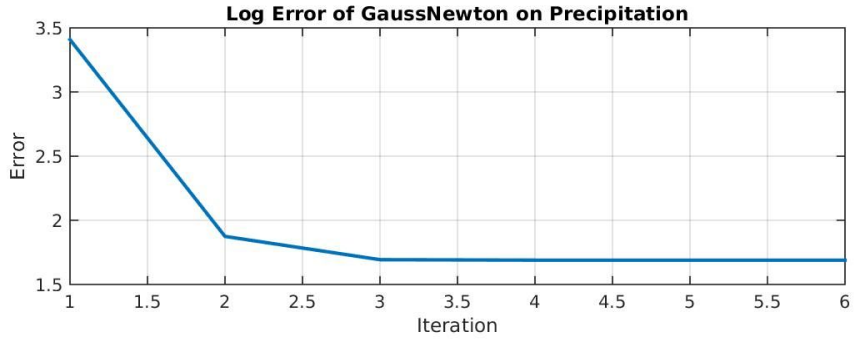
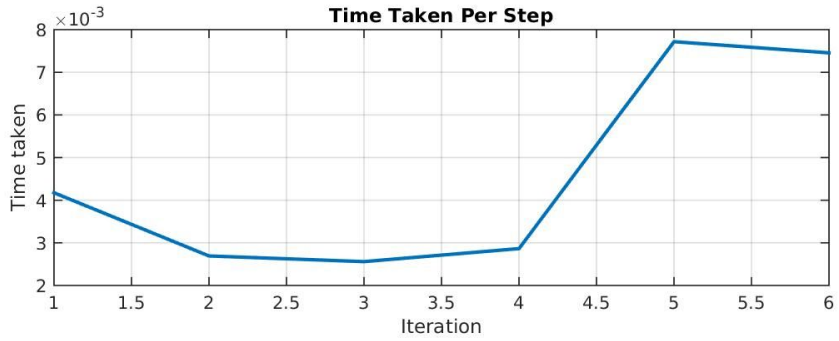
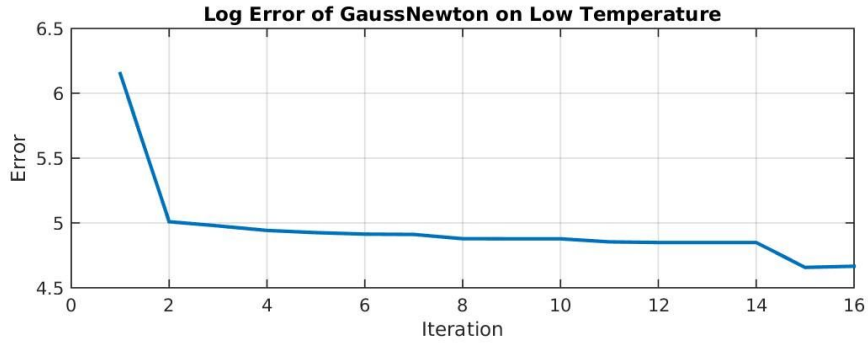
Analysis:

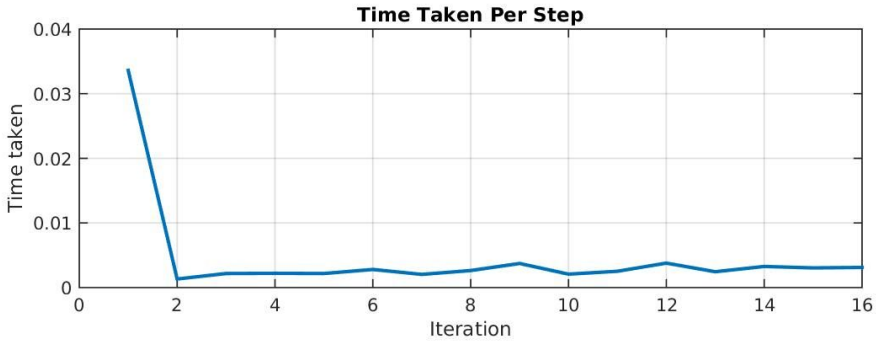
- Gauss Newton Method consistently performed significantly faster than Levenberg-Marquardt in terms of CPU time.
- Levenberg-Marquardt was able to converge to slightly lower error value for precipitation dataset than Gauss Newton, but did not work well with low and high temperature dataset.
- Levenberg-Marquardt took less number of iterations to converge to the value in case of precipitation dataset, than Gauss Newton.
- Gauss Newton did work better on the temperature dataset , both in CPU time and number of iterations.

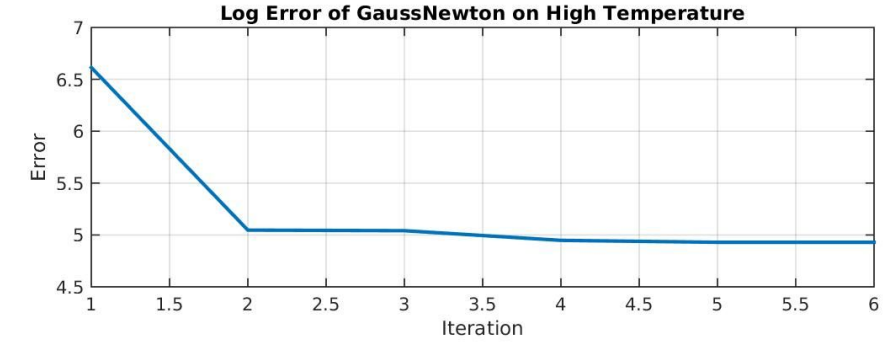
Plots for Gauss Newton Method:

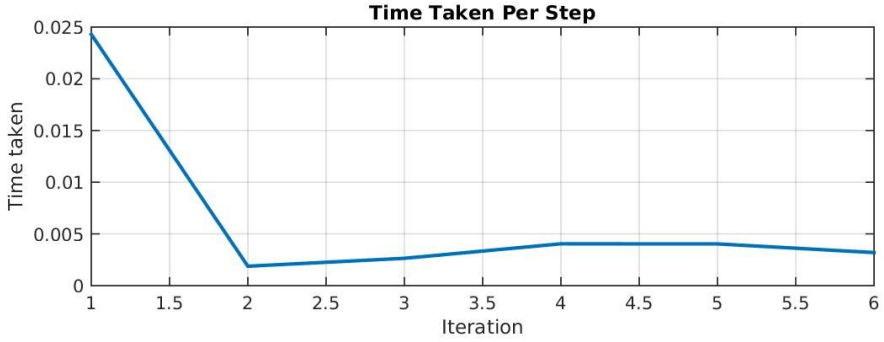












Logs:

Initial Value:

[0.4909 0.4893 0.3377 0.9001]

Converged Values for Gauss Newton on Precipitation Data:

[0.1454 -3.7869 -0.2921 3.4265]

f(x*)= 5.4179

Converged Values for Gauss Newton on High Temperature Data:

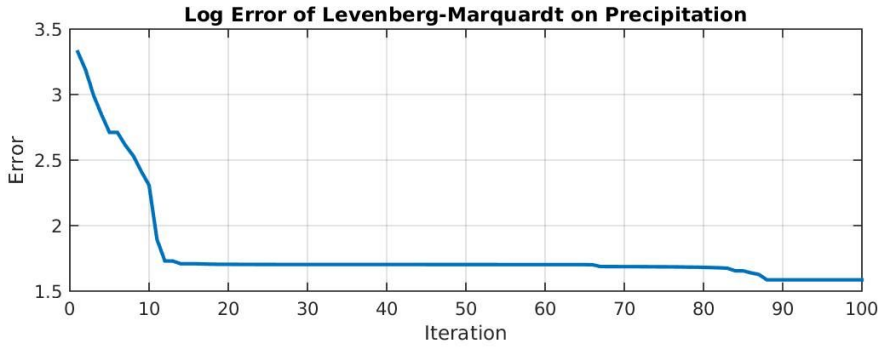
[-2.0914 -263.3757 -36.3399 66.5610]

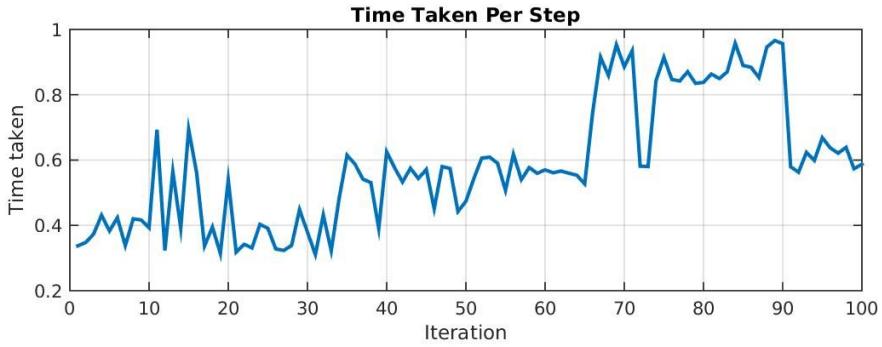
f(x*)= 138.2628

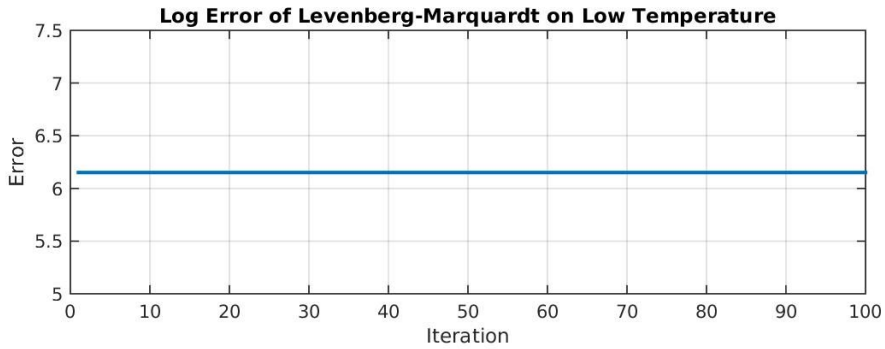
Converged Values for Gauss Newton on Low Temperature Data:

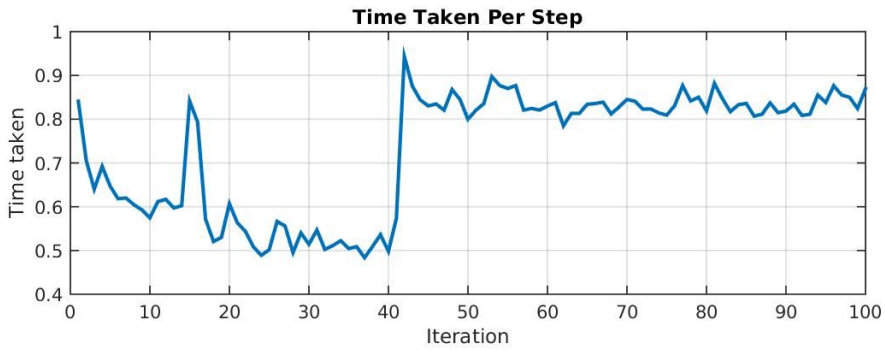
[-13.5941 19.5450 5.6771 35.6575]

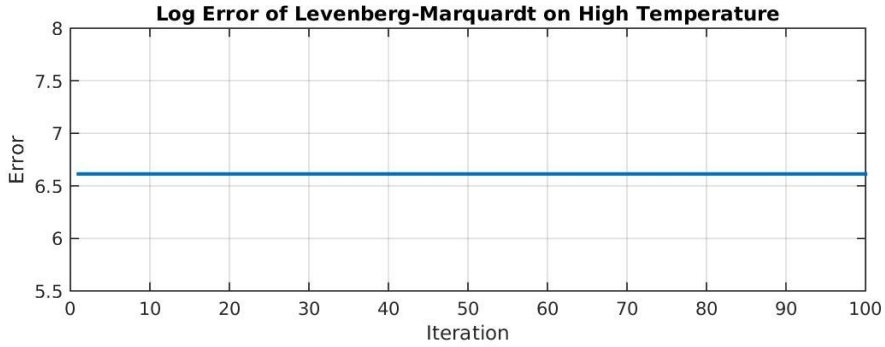
Plots for Levenberg-Marquardt:

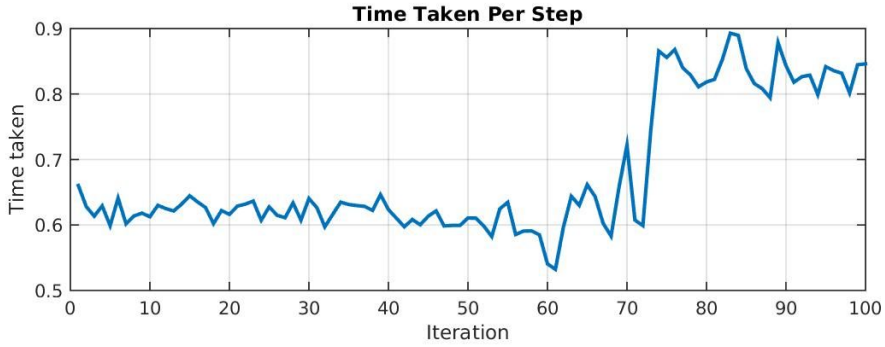












Logs:

Initial Value:

[0.4909 0.4893 0.3377 0.9001]

Converged Values for Levenberg-Marquardt on Precipitation Data:

[-0.2491 0.2745 -2.3420 3.3441]

f(x*)= 4.8858

Converged Values for Levenberg-Marquardt on High Temperature Data:

[0.4909 0.4893 0.3377 0.9001]

f(x*)= 745.3517

Converged Values for Levenberg-Marquardt on Low Temperature Data:

[0.4909 0.4893 0.3377 0.9001]

f(x*)= 469.3517

Code:

findtau.m - Compute tau used in trust-region dogleg approach.
func_precipitation.m - function for precipitation dataset
func_temperature_high.m - function for high temperature dataset
func_temperature_low.m - function for low temperature dataset
gaussnewton.m- Gauss Newton method
levenmar.m - levenberg-marquardt method
main.m - Main method
StepSizeSW.m - Compute Wolfe Step Size

Plots:

Plots for Gauss Newton:

- gaussNewtonPrecipitation49.jpg
- gaussNewtonTemperatureHigh49.jpg
- gaussNewtonTemperatureLow49.jpg

Plots for Levenberg Marquardt:

- levenMarPrecipitation49.jpg
- levenMarTemperatureHigh49.jpg
- levenMarTemperatureLow49.jpg