# Report

Data1:-

This dataset is a 2 dimensional dataset. And after applying our Linear Regression we can easily plot and visualise the data. After that, I realised that this is a normal case of linear regression model. After that, I created another linear regression of scikit-learn. After that I compared both the models (my model vs scikit-learn model).

Errors of my model vs scikit-learn.

Model	MSE	MAE	RMSE	R_Square
myModel	2.0785254017773265	1.2805559784291463	1.4417091945941547	0.9579571905586358
scikit-learn	2.0785254017773283	1.2805559784291471	1.4417091945941554	0.9579571905586357

In this dataset I have applied a multi-linear regression model means simple linear regression model because i got the same value of MSE, MAE, RMSE and R_Square as scikit-learn value and the value of R_Square is 0.9579571905586358 is close to 1 which we can say that my model is working well with simple linear regression.
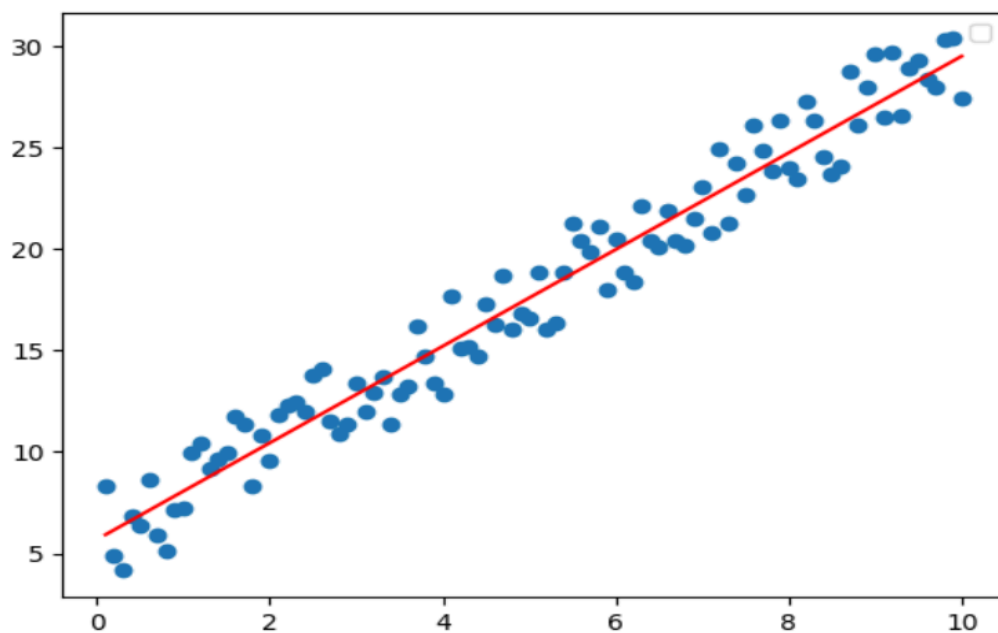
Graph of difference between predicted data of my model and real data. And the difference is uniformly distributed.
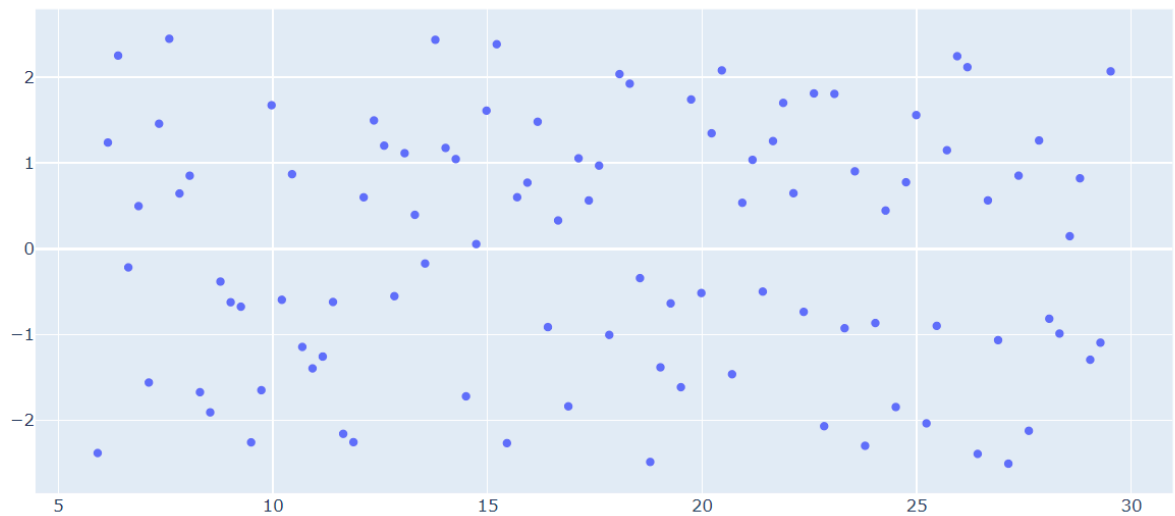

Equation of best fit hyperplane is :-
Y = 2.38406007x + 11.36157425

Data2 :-

First I scatter the dataset on the plotly. So, I observed that it is exponential data. I have applied the simple linear regression in this model after applying some exponential and logarithmic transformation and got the same value as the scikit-learn. The value of MSE, MAE, RMSE and R_Sqare is the same as scikit-learn and the value of R_Square is 0.7890683143668353 which is closer to one which means our model is working well with the dataset.

Errors of my model vs scikit-learn.

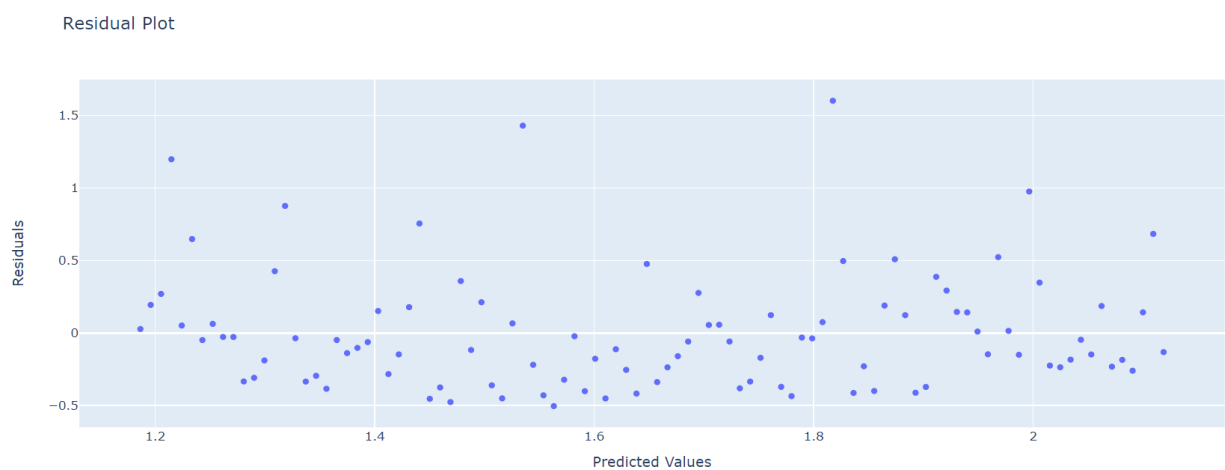| Model	MSE	MAE	RMSE	R_Square
myModel	8892037637. 21325	25883.6365 2443076	94297.60143 934336	0.78906831436 68353
scikit-learn	8892037637. 21342	25883.6365 2443066	94297.60143 934343	0.78906831436 68335
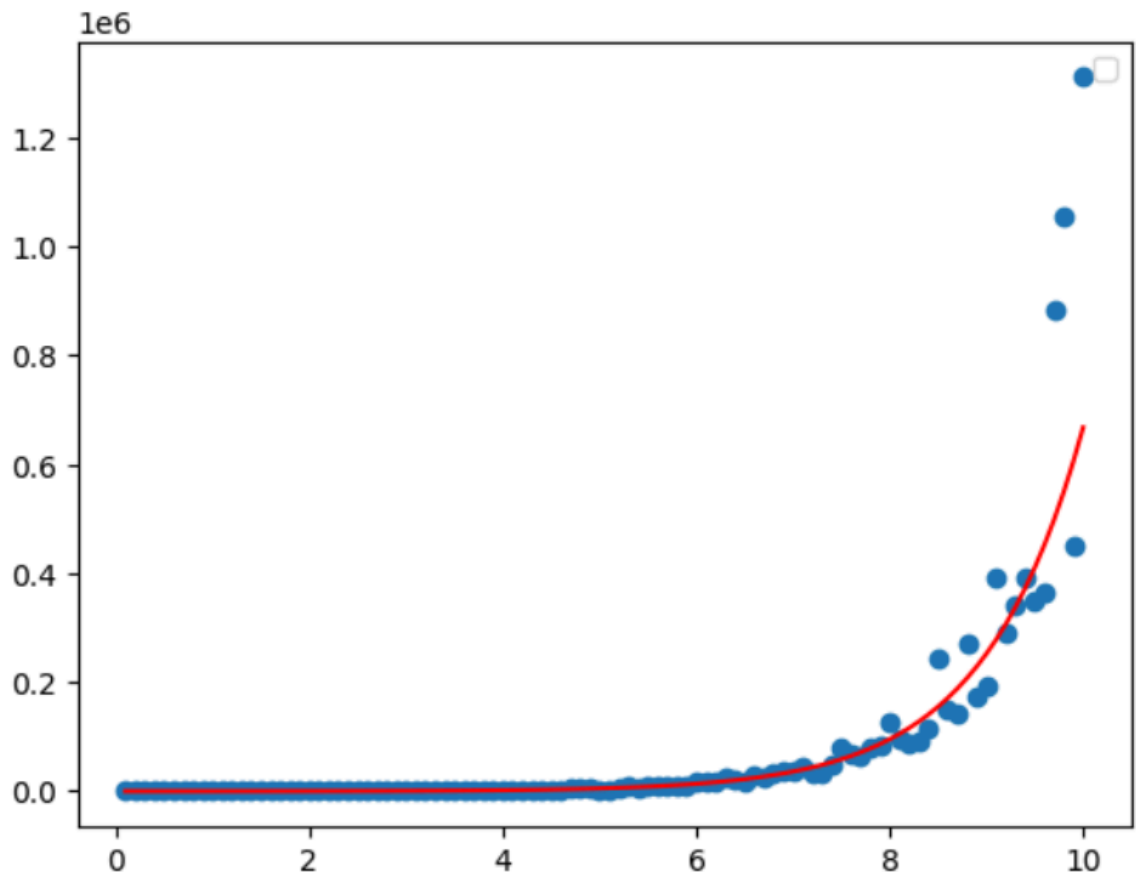
Data3 :-

The dataset after applying the usual linear regression model does not give the best fit line as the R_Square value is very low. Then again I applied the transformed it to logarithmic and applied the usual linear regression to this logarithmic transformed dataset. Still it does not give a better model than normal linear regression applied before. Since the data set is more dispersed having ups and down. So this model will require the polynomial transformation to the input dataset to get the best fit hyperplane.

Errors of my model vs scikit-learn.

Model	MSE	MAE	RMSE	R_Square
myModel	0.16173044143088552	0.2946779330131036	0.4021572347116057	0.31369732267280803
scikit-learn	0.16173044143088552	0.29467793301310374	0.4021572347116057	0.3136973226728076
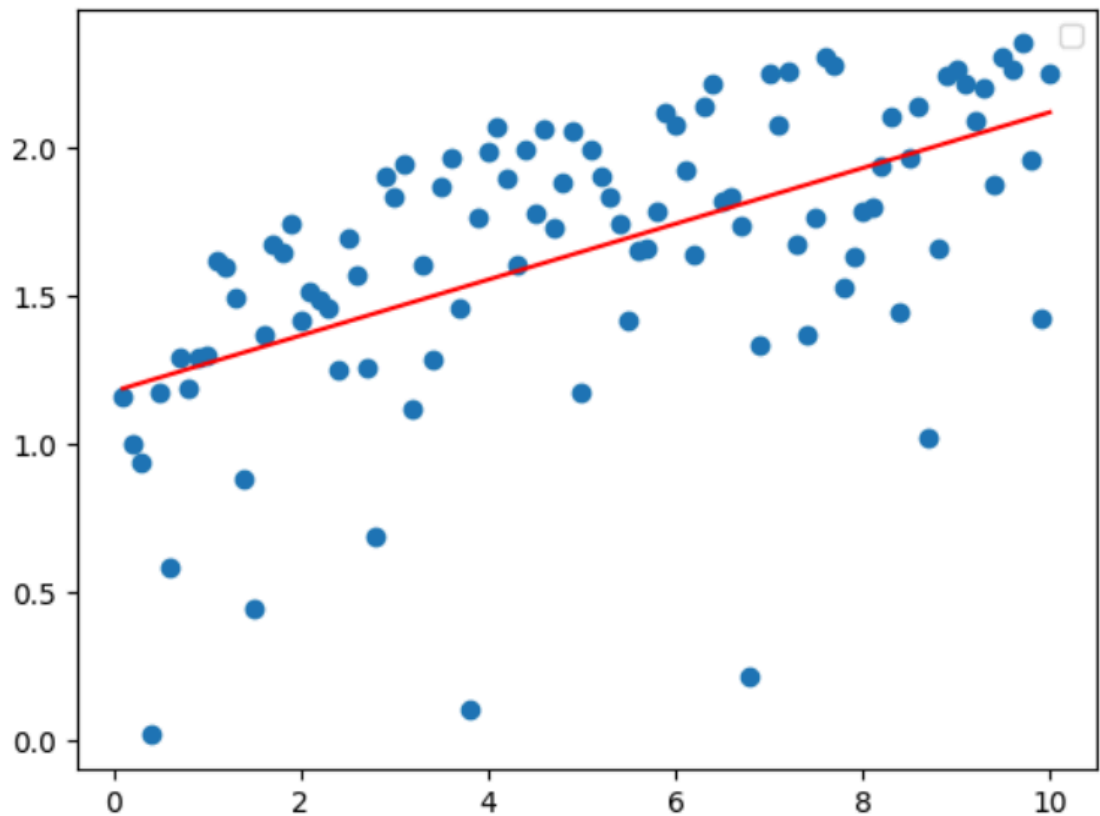
Graph of difference between predicted data of my model and real data. And the difference is uniformly distributed.

Data4:-

This is a 4 dimensional dataset. I directly applied normal linear regression and it directly gives good results meaning the value of R_Sqaure is very close to 0.98 which means my model is working good with the data set.

Model	MSE	MAE	RMSE	R_Square
Linear Reg.	34.620480829	5.155501859	5.88391713310	0.984174905894
Gradient Des.	34.629817535	5.160049935	5.8847172555	0.984706016638