

# Problem Set 8

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## Q5

Table 1: Comparison of True Beta and Estimated Beta

True Beta	Estimated Beta
1.50	1.5005793
-1.00	-0.9956182
-0.25	-0.2486498
0.75	0.7471903
3.50	3.5017669
-2.00	-1.9994365
0.50	0.5011339
1.00	0.9987400
1.25	1.2528300
2.00	1.9993846

According to table 1, true  $\beta$  and estimated  $\beta$  are highly close.

## Q7

According to table 2, L-BFGS algorithm and Nelder-Mead algorithm have given me very similar results.

## Q9

Table 2: Comparison of Optimization Results

<b>LBFGS Algorithm</b>	<b>Nelder-Mead Algorithm</b>
1.500579	1.50021
-0.9956182	-0.9962025
-0.2486498	-0.2483371
0.7471903	0.7469738
3.501767	3.50032
-1.999436	-1.997343
0.5011339	0.5034537
0.99874	0.9972504
1.25283	1.251888
1.999385	2.000062

	Model 1
X1	1.501 (0.002)
X2	-0.996 (0.002)
X3	-0.249 (0.002)
X4	0.747 (0.002)
X5	3.502 (0.002)
X6	-1.999 (0.002)
X7	0.501 (0.002)
X8	0.999 (0.002)
X9	1.253 (0.002)
X10	1.999 (0.002)
Num.Obs.	100000
R2	0.991
R2 Adj.	0.991
AIC	144993.2
BIC	145097.9
Log.Lik.	-72485.615
RMSE	0.50