Data Science
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Problem Set 8

	beta	beta_OLS	beta_GD	beta_OLS_L	beta_OLS_NM	beta_MLE	beta_LM
X1	1.50	1.50	1.50	1.50	1.50	1.13	1.50
X2	-1.00	-0.99	-0.99	-0.99	-0.99	-1.09	-0.99
X3	-0.25	-0.25	-0.25	-0.25	-0.25	-0.30	-0.25
X4	0.75	0.74	0.74	0.74	0.74	0.76	0.74
X5	3.50	3.50	3.50	3.50	3.50	3.73	3.50
X6	-2.00	-2.00	-2.00	-2.00	-2.00	-2.18	-2.00
X7	0.50	0.50	0.50	0.50	0.50	0.47	0.50
X8	1.00	1.00	1.00	1.00	1.00	1.00	1.00
X9	1.25	1.26	1.26	1.26	1.26	1.31	1.26
X10	2.00	2.00	2.00	2.00	2.00	2.14	2.00

1. **Question 5** How does your estimate compare with the true value of β in (1)?

   From the column beta_OLS, we can see that my estimates are very close to the true value.

2. **Question 7** Do your answers differ?

   From the column beta_OLS_L and beta_OLS_NM, we can see that the results of two different methods are the exactly same.

3. **Question 9** In your .tex file, tell me about how similar your estimates of β are to the "ground truth" that you used to create the data in (1).

   From the table 1 on next page, we can find that each of the variables is significant under $p < 0.01$.

Table 1:

	Dependent variable:
	Y
X1	1.501^{***}
	(0.002)
X2	-0.991^{***}
	(0.003)
X3	-0.247^{***}
	(0.003)
X4	0.744^{***}
	(0.003)
X5	3.504^{***}
	(0.003)
X6	-1.999^{***}
	(0.003)
X7	0.502^{***}
	(0.003)
X8	0.997^{***}
	(0.003)
X9	1.256^{***}
	(0.003)
X10	1.999^{***}
	(0.003)
Observations	100,000
R^2	0.971
Adjusted R^2	0.971
Residual Std. Error	0.500 (df = 99990)
F Statistic	$338{,}240.000^{***}$ (df = 10; 99990)
Note:	*p<0.1; **p<0.05; ***p<0.01