In-class problems – Regression and Application

CIVL 7012/8012: Probabilistic Methods for Engineers

Question 1: (Reference Problem 1) For the same 10 zones, conduct three sets of multiple regression using an appropriate software as follows:

a. Between Y and X_2 and X_3
b. Between Y and X_2, X_3 and X_4
c. Between Y and ln X_1
d. Between Y and X_1

Provide a brief description of the ANOVA, standard error of the estimate, R^2-value and t-statistics. Also check the results of your manual analysis in problem 1a) with the computer solution (d above).

Which one of the four equations would you recommend and why?

Table 1

Zone No.	Employment				Peak-hour Trips Attracted (Y)
	Total (X_1)	Manufacturing (X_2)	Retail & Services (X_3)	Other (X_4)	
1	9,220	6,600	2,500	120	9,500
2	2,045	125	1,905	15	2,200
3	574	228	87	259	330
4	127	0	127	0	153
5	3,850	2,750	800	300	3,960
6	995	105	805	85	1,200
7	223	165	58	0	240
8	36	6	30	0	55
9	2,250	1,560	515	175	2,100
10	209	36	173	0	230

Question-2: Use an appropriate software package to calibrate a model of the form $10^y = AX^B$.

X:	45	6	25	11	5	16	19	11	15	22
Y:	1.5	4.1	2.1	2.7	4.1	2.1	2.5	2.8	1.9	2.0

Question-3: Data shown relating to the daily person-trip productions per dwelling unit (Y) and residential density (X) dwelling units per acre. Use an appropriate software package to calibrate a model of the form $Y = (a + bX)^{-1}$.

X:	3.5	6.5	4.0	2.3	6.2	3.0	4.4	3.3	6.0
Y:	31.0	11.0	45.0	68.0	11.0	22.0	43.0	35.0	11.0

Question-4: See the binary choice problem description in Excel