



MOJAKOE

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Analitik Bisnis
UTS Semester Ganjil
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Problem 1 (Simple Linear Regression Analysis)

The mayor of a city A wants to predict their number of weekly bus passengers. Below is the following data of the number of weekly bus passengers as well as their average monthly income per city:

City	Number of weekly bus passengers	Average monthly income of bus passengers
1	192,000	\$5,800
2	177,600	\$6,500
3	180,800	\$8,200
4	160,800	\$11,800
5	159,200	\$11,830
6	148,800	\$12,650
7	136,000	\$14,468
8	126,240	\$15,000
9	123,888	\$15,200

- a) Compute the regression coefficients b_0 and b_1 using the simple linear regression method!
- b) If it is estimated that the average monthly income of bus passengers in city A is \$10,000. What is the predicted number of weekly bus passengers in city A?

Problem 2 (Multiple Regression Analysis)

In applying for graduate education, candidates are required to hand over their application forms and supplementary documents pertaining to their Graduate Record Examinations scores (GRE Score), Test of English as a Foreign Language scores (TOEFL Score), Undergraduate GPA, and Research Experience. In order to estimate the significance of each variable, the following estimated equation was created based on the data collected from 106 individuals and their probability of admission.

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

where

- \hat{Y} = Expected probability of admission
- X_1 = GRE score
- X_2 = TOEFL score
- X_3 = Undergraduate GPA (10 point system)
- X_4 = Research experience (In Binaries)

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.872569865
R Square	0.761378169
Adjusted R Square	0.751927799
Standard Error	0.0850852
Observations	106

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	2.333026477	0.583257	80.56597	1.48049E-30
Residual	101	0.731188618	0.007239		
Total	105	3.064215094			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>
Intercept	-1.988419194	0.283235341	-7.02038	2.61E-10	-2.550281921
GRE Score	0.004549143	0.001609574	2.826302	0.005677	0.00135618
TOEFL score	0.001693676	0.002957013	0.572766	0.568076	-0.004172242
Undergraduate GPA	0.118816348	0.022167028	5.360049	5.27E-07	0.074842927
Research Experience	0.048339765	0.018554029	2.605351	0.010564	0.011533563

- In this multiple regression analysis, what type of relationship between the dependent variable and set of independent variables is assumed? (linear, multiple, curved, none of these)
- Based on the estimated equation above, estimate the probability of admission of an individual with a GRE score of 310, TOEFL score of 111, Undergraduate GPA of 9.75, and no research experience!
- Explain the model's goodness of fit!
- Is the overall model statistically adequate at a 0.05 level of significance for predicting the probability of admission?
- Conduct an individual test of hypothesis to determine whether the independent variables above affect the dependent variable! (Assume a 0.05 level of significance)

Problem 3 (Forecasting-Weighted Average)

The manager of Classic Furniture Co. wants to predict the demand of their best seller product, teak wood table. Below is the information of the demand for the past 10 months.

Month	Demand
January	130
February	175
March	190
April	120
May	145

June	160
July	180
August	185
September	210
October	200

- Compute a 3-month moving average forecast for April through October
- Compute a weighted 3 month moving average forecast for months April through October Assign weights of 0.1, 0.4, and 0.5 of to the month in sequence, starting with the most recent month
- Compare the two forecasts by using MAD and MAPD. Which forecasts appear to be more accurate?

Problem 4 (Forecasting - Exponential Smoothing)

The Brussel Co's stock had the following average monthly price for the past 7 month

Month	Stock Price
1	105.3
2	107.2
3	103.6
4	106.8
5	110.2
6	111.5
7	112.1

- Determine the forecasted stock price for month 6 and 7 based on exponential smoothing forecast with $\alpha=0.4$ with January forecast of 106
- Determine the forecasted stock price for month 6 and 7 based on adjusted exponential smoothing forecast with $\alpha=0.4$ and $\beta=0.2$, with January forecast of 106 and $T=0$
- Compare the accuracy of the 2 forecasts with MAD. Determine which forecasts appears to be more accurate

Problem 5 (Game Theory)

Brock and John are bartering. Brock has calculated the value of and bundled several set of goods which guarantees him a profit from the barter. The following payoff table shows the gains for Brock and the losses for John given the set of goods they barter with.

Brock's Set of Goods	John's Set of Goods		
	A	B	C
1	60	58	40
2	35	48	45
3	15	37	33

- Determine the initial set of goods (strategy) that each individual will pick!
- Is the following game above a pure or mixed strategy game. Explain!

Problem 6 (Spreadsheet Modeling)

Koyota Car's salesperson calls on potential customers who might buy their three newest product : Caya, Vilo, and Nav. For each call, there is a 15% chance that the customers are willing to buy one of the cars, but it's turn out that 30% percent of those customers who are willing to buy the cars don't get loan from the bank so they can't buy it. The remaining still buy it. Of these, 40% will buy Caya, 25% will buy Vilo, 35% will buy Nav.

The pricelist of the cars is as follows :

- Caya** \$12.500
- Vilo** \$23.000
- Nav** \$54.000

The commission schedule is as follows:

<u>Transaction</u>	<u>Amount Commission</u>
Caya	$\$35 + 0.5\%$ price of the car
Vilo	$\$65 + 0.4\%$ price of the car
Nav	$\$115 + 0.3\%$ price of the car

Develop a spreadsheet model to calculate the salesperson's commission based on the number of calls per month made. What is the expected commission based on making 300 calls?