

- (1) autoregression
- (2) multicollinearity
- (3) power function
- (4) central limit theorem
- (5) likelihood function

統計學甲

(15%) 1. Three factories produce cars, including some lemons, according to the following schedule:

	Proportion of All Output	Rate of Producing Lemons
Factory A	40%	1/100
Factory B	40%	1/25
Factory C	20%	1/10

If you go to a dealer and buy a car at random, what is the probability that it is produced by factory C

- (1) if you have no further information?
- (2) if it turns out to be a lemon?
- (3) if it turns out not to be a lemon?

(20%) 2. Let X_1, X_2, \dots, X_n be a random sample of size n from a normal distribution $N(\mu, \sigma^2)$. Consider the following point estimators of μ :

$$\bullet \mu_1 = \frac{1}{n} \sum_{i=1}^n x_i$$

$$\bullet u_2 = x_1$$

$$u_3 = \frac{x_1}{2} + \frac{1}{2(n-1)}(x_2 + x_3 + \dots + x_n)$$

- (1) Which of these are unbiased?
- (2) Which of these are consistent?
- (3) Find the relative efficiencies: μ_1 to μ_2 , μ_1 to μ_3 , μ_2 to μ_3 .

(20%) 3. Let X_1, X_2, \dots, X_k be independent and normally distributed with mean μ_i and variance $\sigma^2_i, i=1, 2, \dots, k$, respectively. Show that $Y = X_1^2 + X_2^2 + \dots + X_k^2$ has a χ^2 distribution with mean $\mu_1 + \mu_2 + \dots + \mu_k$ and variance $\sigma^2_1 + \sigma^2_2 + \dots + \sigma^2_k$.

(25%) 4. We have a data set as follows:

X	1	2	3	4	5
Y	130	145	150	165	170

Please answer the following questions:

- (1) Compute the regression line Y on X (i.e. $Y = a + bX$).
- (2) Compute the t values for the parameter estimates a and b. Are they significant?
- (3) Compute the coefficient of determination (R^2) for the regression.

(20%) 5. Explain the following terms: (4% each)

- (1) autoregression
- (2) multicollinearity
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$$(1) C = \begin{bmatrix} 2 & 4 & 4 & 4 \\ 4 & 2 & 4 & 4 \\ 4 & 4 & 2 & 4 \\ 4 & 4 & 4 & 2 \end{bmatrix} \quad \text{試求 } C^{-1}$$

$$(2) C = \begin{bmatrix} 2 & 1 & 0 & -1 \\ 1 & 0 & -1 & 2 \\ 0 & -1 & 2 & 1 \\ -1 & 2 & 1 & 0 \end{bmatrix} \quad \text{試求 } C^2$$

七、試求下列矩陣之特徵值 (eigenvalue) 特徵向量 (eigenvector) 對角矩陣 (orthogonal matrix) 和對角化 (Diagonalization) 矩陣 (12%)

$$\begin{bmatrix} -1 & 0 & 0 \\ -1 & 0 & 0 \\ -1 & -1 & 1 \end{bmatrix}$$

八、試求極大(極小)值：(10%)

$$\max \quad xyz$$

$$\text{S.T. } x^2 + y^2 = 1$$

$$x - z = 0$$

八十二學年度

管理學

三、(15 points)

XYZ Company's share price is now \$60. Six months hence, it will be either \$75 with probability .70 or \$50 with probability .30. A call option exists on the stock that can be exercised only at the end of 6 months at an exercise price of \$65.

- If you wished to establish a perfectly hedged position, what would you do on the basis of the facts just presented?
- Under each of the two possibilities, what will be the value of your hedged position?
- What is the expected value of option value at the end of the period?

四、(10 points)

Company AA and Company BB are identical except for capital structures. Company AA has 50 percent debt and 50

- b) avoid taxes
- c) cause balance of payments difficulties
- d) exploit low-wage workers in less developed countries
- e) all of the above

6. Which of the following theories identified specialization as the main reason for international business activity?

- a) product life cycle theory of international trade
- b) theory of diversification
- c) doctrine of comparative advantage
- d) theory of globalization
- e) none of the above

7. The major advantage of expanding overseas by acquiring going concerns instead of building new operations from scratch is to

- a) quickly transfer parent skills to the acquired company
- b) gain access to the acquired company's customers
- c) reduce costs
- d) a and b
- e) none of the above

8. According to the efficient market hypothesis

- a) markets discount the future
- b) today's stock price is the best predictor of tomorrow's stock price
- c) stock prices reflect all available information

d) today's stock price incorporates the past history of prices

e) all of the above

9. Which of the following products is most likely to benefit from depreciation of the dollar?

- a) high-end signal processor from Hewlett-Packard that faces minimal competition
- b) Chevrolet automobile with a highly elastic demand
- c) Mercedes-Benz buto facing price inelastic demand
- d) low-end Japanese machine tool
- e) all of the above will benefit significantly from a falling dollar

10. If annualized interest rates in the U.S. and France are 9% and 13%, respectively, and the spot value of the franc is \$.1109, then at what 180-day forward rate will interest rate parity hold?

- a) \$.1070
- b) \$.1150
- c) \$.1080
- d) \$.1130
- e) none of the above

統計學乙

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