［02_3］統計數理研究表紙会報等

ABSTRACT

Relations between Macroeconomics and Microeconomics

by Isamu Yamada

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"Aggregation Problems", which deal with the theoretical relations between macroeconomics and microeconomics, have been developed by Dr. L. R. Klein, Mr. K. May, Mr. S. S. Pu, etc. The writer introduces those results historically at first, and then, suggests more generalized connections between these two economics, which do not impose those particular conditions upon production function which have done by Dr. L. R. Klein.

The Sample Survey of Rice and Sweet Potato Planted Area in Japan, 1948.

by Yusuke Tanaka

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The plan of survey

The purpose of the present sample survey is to determine the correct planted area of each crop through the following procedure, i. e. estimating the omitted area and adjusting the erroneous reports in respect to paddy, up land rice and sweet potato planted area. The "Ko aza" is to be selected as the primary sampling unit. The parcel number, class and area of the whole cultivated land within the sampled area are entered into the schedule of the survey according to the land ledger and the names of the tillers are entered according to the land ledge or the land ledge repared by the Agricultural Land commission.

The formula to estimate the total Panted area of paddy rice is

$$X^* = \frac{\sum\limits^{R} \frac{M_i}{m_i} \sum\limits^{m} \frac{N_{ij}}{n_{ij}} \sum\limits^{n_{ij}} X_{ijk}}{\sum\limits^{R} \frac{M_i}{m_i} \sum\limits^{m} \frac{N_{ij}}{n_{ij}} \sum\limits^{n_{ij}} Y_{ij}} \times y + \sum\limits^{R} \frac{M_i}{m_i} \sum\limits^{m} Z_{ij}$$

where

Y_{ijk} is a reported acreage of k-th cultivated land which belongs to i-stratum, j-th primary unit. X_{ijk} is an actually measured acreage. Z_{ij} is a total acreage of cultivated land in i-th stratum, j-th primary unit planted with paddy rice for which report is wanting. y is the total reported planted acreage of paddy rice.

Some Estimating Methods of Probable Flood and Their Application to Japanese Rivers

by Shigehisa Iwai

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First the theories and procedures of five methods by Fuller, Hazen, Goodrich and Slade, used generally for estimating porbable flood in America, were precisely investigated and practically applied to River Tone in Japan, using the date of annual floods for 25 years at Kuri hashi. As a result it was recognized that to adopt foreign semiempirical formulas for Japanese rivers without any modification is dangerous and that we cannot hope to get accurate result, without standing upon statistical grounds.

Among these statistical mathods, the methods based upon "the distribution obtained by logarithmically transforming the variable in Gauss' Normal Distribution" seemed to be effective. Thus a new estimating method based upon this type of distribution was proposed which is appreciated to be the most theoretical and applicable method.

Furthermore, upon investingating many Japanese rivers, River yodo and etc. besides River

Tone, with the above methods, it was found that the coefficients of flood were significantly larger and the coefficients of variation and skewness were very different compared to the respective coeffients of American rivers. This fact is a sound basis that Japan is a very floody country. Also it is known that the presumed flood discharge of River Tone is much less than those of many other rivers, the presumed flood discharges of the former being estimated as from 25 to 40 years flood in the improvement work at Kurihashi, while the flood discharges of the latter as from 50 to 100 years floods, so the dangerous condition at Kurihashi should have been precautioned before the disaster of Sept., 1947. But at any rate Japanese river seldom have adequate presumed flood discharges greater than 100 years flood which is the American minimum standard. We should, therefore, adopt proper flood discharges for our rivers upon considering the financial condition of our country. Hence, it is stressed that such a study is not only absolutely necessary in future, but also that it is a very effective method in planning an ideal river controle works according to the weights of the various rivers from the point of view of statistical economics.

Upon application of the methods of Grassberger, Gibrat and Kimball, the writer proposed a different new precise method and found a stochastical testing method of goodness of fit o estifmiated duration curve from the theory of small samples, the details of which will be explained at the next opportunity.

An operator-theoretical treatment of temporally homogeneous Markoff process

by Kôsaku Yosida

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As applications of the theory of the differentiability and the representation of one-parameter semi-group of linear operators (K. Yosida: J. of the Math. Soc. of Japan, 1 (1948), 15-21), the following results are obtained. i) A characterisation of the differential quotient operator of the one-parameter semi-group of transition operators arising from the temporally homogeneous Markoff process. ii) An operator-theoretical interpretation of the infinitely divisible law of P, Lévy. iii) An operator-theoretical integration of the so-called Fokker-Planck's equation.

Multi-variate Distribution and Ratio -estimates.

by Toshio Kitagawa, Kyu Kusuda, Mitsuomi Tsutsumi

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Two-dimensional Gibrat distributions are introduced, and their various statistical measures are calculated. The object of this paper is to give ratio-estimates concerning two-dimensional Gibrat distributions, which are frequently met in social and econometrical data.

Revised Method of Sample Survey for Monthly Labour Statistics (I)

by Heihachi Sakamoto

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Critique on the former method - In order to revise the former method of sample survey let us criticize the former one from the stand point of aim, items, scope, calculation, range of error and expenses and clarify the reasons why we are planning positively its revision.

Aim - In the former method as in the revised one, the principal aims are compute the average wages and to form the wage index. But what do the average wages mean ? If it means the

wage level, the survey is to be undertaken necessarily not only on the wage distribution, but also on the structure of wages by industry, occupation, age, number of dependents and sex.

- Scope - In the former sample survey, all establishments with 75% or more of total employees of each all industries–exclusive of estblishments with 10 or less employees and of agriculture, forestry and fishery–are covered. But by this method there occurs, such inconvenient cases where in one industry only the establishments with 1,000 or more employees are selected and in other industry only the establishments with 50 or more employees are sampled. This means that the object of the survey is different by industry and the scope of the survey lacks precision.

The idea to undertake a cut–off survey by the percentage of employees betrays the desire to survey, if possible, all establishments and the necessity to exclude the establishments of small size in view of the difficulty of the survey. If so a more precise and less biassed sample survey is to be planned with the same expenses and time. Which of the former method and the revised method is better will be shown on following tables by analysing concrete figures.

Error - The scope of survey-that is, the population-determined, the error of estimated values brought from the method of survey should be called in question. It's most desirable that the error of value should be within a certain range, selecting for the population the employees of establishments with 30 or more employees in each of industries (shown on the attached Industrial Classification Table)-in the undertakings of extremely small size, employees of establishments with a certain number of employees or more

Expenses and Time—If expenses and time permit, the areal or more-Expenses and Time - If expenses and time permit, the areal

sampling method is the best. The cut-off survey is not desirable, because the employees of the establishments with a certain number of employees or less are omitted and therefore the survey does not reflect general wage conditions. As is shown on following table formed from the analysis of concrete figures, the wage level of employees of small size establishments is remarkably low. But this survey on wage conditions is not undertaken now because of erorr brought from the method of current survey. Even if the scope of the survey is limitted in cut-off survey, the samples selected from the list of establishments do not necessarily represent the population.

Only the establishments registered at the time of Establishment Census are shown on the list, so later changes in the number on size of these establishments is not to be seen on the list. From this point of view, the areal sampling method, showing everchanging aspect of industrial world is to be adopted. In this paper the auther intended to design a reasonable sample survey, using modern sampling theory.

Some measures of variabilities in sampling from finite multivariate populations

by Motosabu ro Masuyama
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If only one quantity is to be estimated on the basis of a sampling survey, it seems logical to design the survey in such a way as to minimize the standard deviation of this estimate, subject to prescribed cost limitations. Most surveys, however, are intended to provide estimates of several population parameters sim-

ultaneously. One way to generalize the theory of optimum sample design to cover this case is to generalize the notion of standard deviation to make it applicable to a vector variate.

Noting that the standard deviation $\sigma(x)$ of a single variate has the properties of a Minkowski metric or gauge function, we introduce two generalized notions of standard deviations. The first one is the p-th root of the sum of the p-th absolute moment about the population mean of each component of a vector variate.

The second one is the p-th root of the sum of $p/2$-th powers of the latent roots of the variance–covariance matrix of a vector variate. ($1 \leq p < \infty$). In an actual survey, it may be desirable to control a weighted mean of the variances of each component, which is also a Minkowski metric function. To generalize the notion of coefficient of variation for multivariate population, we introduce $(a'V^{-1/2}WV^{-1/2}a)^{-1/2}$,

where a, W and V are the population mean, a weight matrix and the variance–covariance matrix. We should assume that V is undegenerated and every latent root of $VV^{1/2}$ is positive.

On Some Distributions on the Certain Statitics of Normal Random Variables Correctee

by Yosio Utida

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For some cases it may be permissible to assume that the correlation between each two normal random variables (intraclass correlation) is the same, but each variable has not the same mean value. The purpose of this paper is to derive the distributions of the statistics of several random variables under the assumption of independence.

—— 會 報 ——

1. 第2卷第3號が種々の手違の爲非常に遲れたことを會員諸氏に御詫致します。引續き第3卷第1～2號を 10 月始め迄に刊行致しますから，此のずれを取戻すことが出來ることと存じます。その內容は裏面に紹介致しました通りでございます。御期待下さい。

2. 入會申込の手續
最近入會希望者が相當增えて參りましたことは甚だ喜ばしいことです。今後此等の方々は直接，統計科學研究會本部の
九州大學理學部數學教室　北川敏男宛
御申込下さい。本部に於いてその手續の御取計を致します。但し「統計數理研究」誌を購讀することだけ御希望の方は發行所
學術圖書出版社　統計數理研究誌係宛
に御註文なさるのが便利かと存じます。

3. 編集部移轉
今囘編集部は東京都世田谷區三軒茶屋町 10, 統計數理研究所より下記へ移轉致しました。
編　集　部　九州大學理學部數學教室內
編集部出張所　學術圖書出版社內

4. 昭和 21 年總會開催の通知
昭和 21 年統計科學研究會總會並に研究發表會を 10月3日東京大學で開催の豫定でございます。尙 10月1, 2 兩日は東大數學教室に於いて日本數學會の統計數學分科會が開かれる豫定にて，それに引續き此の總會が行われることとなります。會員諸氏の御參會を御待ちして居ります。

研究發表希望者は題目，所要時間，內容の槪要等を 9月 25 日迄に到着する樣，九州大學理學部數學教室　北川敏男宛　御申込下さい。