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advantages of this sampling plan is that the number of items inspected is fewer than that of Dodge-Romig sampling plan or JIS Z9006.

The objective of new inspection plan is to choose the inspection level which minimizes the sum of inspection cost and losses which occurs in the disqualification of a lot at the consumer's inspection. In this way, this inspection plan has characteristics that enables us to develop strategic inspection activities. This article concludes with the analysis of the characteristics of the plan and comparison with Dodge-Romig sampling tables and JIS Z9006.

**Latent Class Analysis**

Akinori OKADA (岡 太 彰)

In the present paper we discuss the estimation of the parameter of the latent class analysis using simulation technique.

The simulations are performed on 4 cases of the number of items $p=5, 6, 7, 8$ and the number of latent classes $m=2$ to see the relation between the item numbers and the fitness of estimated latent parameter solved by Green's method. The result of this simulation shows that the Green's method should be employed when $p \geq 7$.

Concerning the Gibson's method, he said in his article that in order to obtain the better estimation of latent parameters, we have to set $k, V$ and $H$ so that (1) all diagonal elements in $J_k$ are distinct and non-zero, and (2) the determinant of $m$-th order matrix of left upper part of $\Pi_{VH}$ is large number. To check this suggestion, 3 cases ($p=5, m=2$) constructed using random numbers were solved by Gibson's method. The result shows that his first suggestion is correct, but the second one is not appropriate.

**On the Reasonable Proportion of Net Worth in the Firms Capital Structure**

Tomoya OHIRA (大 平 知 弥)

In the face of Japan's capital liberalization movement and recent frequent occurrences of bankruptcy, the problems of corporate capital structure have lately been drawing renewed attention from business circles. Analysis of those problems is mostly based on the understanding of the circumstances provided by Japan's
rapid recovery from her war devastated economy and her continued phenomenal economic growth over the last 20 odd years. The firm's position in relation to financial institutions, and to each of the industrial, household, and government sectors of the economy also needs to be grasped in determining the "appropriate" capital structure of the firm.

This thesis attempts to determine whether there exists a "proper" proportion of net worth in the firm's capital structure. Parts I-2 through I-5 examine the merits and demerits of maintaining both high and low proportion of net worth in the firm's capital structure. A mathematical formulation for a "proper" capital structure is derived from the foregoing analysis.

Part II covers the results of the capital structure survey on 530 firms in Japan; the applicability of the mathematical formulation derived in Part I to the existing firms is analyzed here.

Areas for further inquiry are indicated, in the final section.

Management Model and its Application to the Optimal Policy Problem

Katsuhiko SAITO (斎藤勝彦)

In this thesis a linear model of a management system and its applications are discussed as an attempt to apply engineering techniques to management decisions.

The linear model, based on the financial data of one organization is expressed as a linear equation system between state and other variables (control, exogenous and known variables) postulating that there are m real valued control variables which are under the decision maker's control and n real valued state variables which describe the state of the system.

Secondly, using this linear model, the optimal policy problems of a decision maker who pursues certain objectives within a given framework of the management system is considered. This problem is handled mathematically as a constrained minimization problem. The theory developed Chapter 3 enables us, in addition to getting the optimal solution of the problem, to apply sensitivity analysis to the solution and to compute the losses associated with erroneous decisions and forecasting. By this analysis much valuable information for decision making will be available.