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|------------------|---|
| Title            | Some proposals on integer programming solutions   |
| Sub Title        |   |
| Author           | 柳沢, 滋(Yanagisawa, Shigeru)  |
| Publisher        | 慶應義塾大学藤原記念工学部   |
| Publication year | 1967  |
| Jtitle           | Proceedings of the Fujihara Memorial Faculty of Engineering Keio University (慶應義塾大学藤原記念工学部研究報告). Vol.20, No.81 (1967. ) ,p.274(98)- 274(98)   |
| JaLC DOI         |   |
| Abstract         |   |
| Notes            | Summaries of Doctor and Master Theses   |
| Genre            | Departmental Bulletin Paper   |
| URL              | <a href="https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO50001004-00200081-0098">https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO50001004-00200081-0098</a> |

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## Some Proposals on Integer Programming Solutions

Shigeru YANAGISAWA\*

This thesis deals with solutions for integer linear programs with zero-one variables, approximate solutions for ordinary integer programs, and integer programming formulations of several practical problems.

After reviewing Gomory's cutting method and Benders' branch-and-exclude method for integer programs, a new method, more efficient branch-and-exclude method, for solving linear programs in which all variables are constrained to take either zero or one is developed. Effective branching algorithm and exclusion rules, which abandon some set of infeasible solutions and a certain set of less optimal solutions, are proposed. The only operations required under the method are additions and subtractions. The method requires considerably smaller memory device than any other preceding methods and may consume less computational times. It is further modified to solve mixed integer linear programs with some variables constrained to take either zero or one and others nonnegative real numbers.

An approximating method for solving integer programs starting with a non-integer solution through the ordinary simplex method is discussed.

Several problems including integer valued parameters occurred actually in production planning and control are formulated into integer programs.

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