long time to obtain an optimal solution and prove that it is optimal.

In common with other integer-programming algorithms it cannot be guaranteed to solve *all* problems within a reasonable time. A useful development in integer-programming theory would be the determination of classes of problem which can and cannot be readily solved. Our experience indicates that these classes may be different for different algorithms. In this connection, we have not had any failures with problems which have been solved by other methods, although our experience has been too limited to make any definite conclusions from this.

Although our experience, and some of the details of the algorithm, are limited to linear-programming problems, the basic principles of the algorithm apply to non-linear problems as well.

Acknowledgements

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Book Review

L'Automatisation des Recherches Documentaires: un modèle générale, Le SYNTOL, by R. C. Cros, J. C. Gardin and F. Levy, 1964; 260 pages. (Paris: *Gauthier-Villars*, 30 F.)

One important question in information-retrieval research is how far document descriptions should be structured: should we describe a document on exports from Britain to America simply by the term list "exports, Britain, America," or by the encodement "exports *r* Britain *r* America," where *r* is some relation? The former is simpler but is undiscriminating: we get documents on exports in either direction. The latter is more selective, but makes retrieval more complicated: should the request "$Ar_1(Br_2C)$" retrieve documents encoded by "$(Ar_1B) r_2C$," say? Most retrieval systems have some lexical organization of terms, to allow searches by associated terms; this already means some complexity, which is much increased if encodements have a syntactic structure. The initial document analysis is also much more work.

In this situation there is an obvious interest in finding the best combination of terms and syntax, and this book describes one of the most thorough and interesting attempts to do so. An encodement in Le SYNTOL consists essentially of terms linked by general logical relations; the terms are incorporated in lexical trees, and there are additional devices for marking the main theme, for connecting trees, and so on. Associated are bodies of rules, for making encodements, and for operating on them in retrieval. The system is described in detail, with chapters on the theory, programming, and experimental results. It is intended to be flexible, so that retrieval may be done by any combination of the aspects of the encodements. The important point is how effective is the detailed relational structure? Unfortunately, the answer seems to be that it is not effective enough, unless one is prepared to pay the cost of very heavily controlled and exhaustive searches.

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