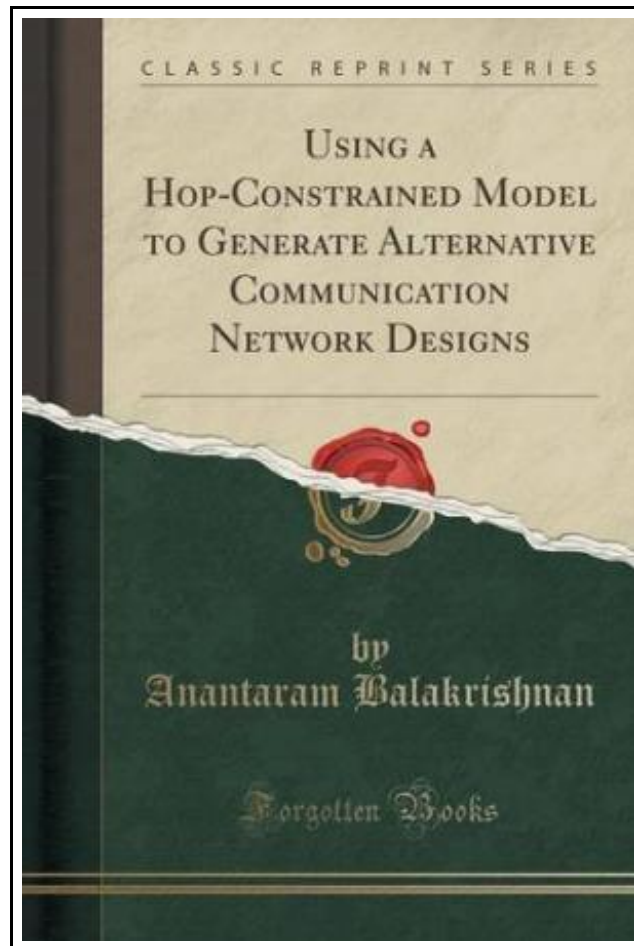# Using a Hop-Constrained Model to Generate Alternative Communication Network Designs (Classic Reprint) (Paperback)

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Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book ***** Print on Demand *****.Excerpt from Using a Hop-Constrained Model to Generate Alternative Communication Network Designs Designing the link topology and selecting capacities in a backbone network of a communication system involves complex tradeoffs between investment and operating costs and service considerations such as network reliability and vulnerability, delays, and blocking. Incorporating all these design criteria simultaneously in a comprehensive model results in a large-scale, non-linear, discrete optimization problem that is intractable. In this paper, we propose an alternate optimization-based methodology that generates several cost-effective backbone network designs with varying cost and performance characteristics. Network planners can use the method in conjunction with detailed performance evaluation techniques to assess the cost impact of different service requirements, and select a design that achieves the proper balance between conflicting objectives. To generate different configurations, the method parametrically varies a set of hop constraints that restrict the number of links over which messages can be transmitted. Reducing the maximum number of hops increases the number of alternate routes but incurs higher total cost for the communication system. For a given set of hop constraints, we develop a Lagrangian-based algorithm to identify a cost-minimizing network design that satisfies all internode traffic requirements. We report results for extensive computational tests of the algorithm using several randomly generated test problems. Our results demonstrate that, even for relatively large problems, the method identifies good heuristic solutions and tight lower bounds that confirm the near-optimality of the selected designs. Using a 25-node example, we illustrate how the model can be used to evaluate the cost versus performance tradeoff. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at This book is a...

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