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Network Optimization: An Introduction to the Network Reconstruction Approach

Network Reconstruction Approach to OPTIMIZATION

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For every problem, mathematical or otherwise, there is more than one approach and much depends on the ingenuity of the person concerned. Consider that a person is interested in picking some fruit from a tree and is considering multiple picking options. One possibility is, if one can reach the fruit, just snip it to retrieve it. The second possibility is to alternatively apply force and detach the fruit from the tree. If neither option is possible, the fruit can still be detached from the tree, but how? A third possibility lies in the fact that just holding on to the fruit and turning it in one direction it can be picked. Similarly, many possibilities are seen by keen eyes while solving a mathematical problem. The reconstruction approach applied in this book is like the third possibility of holding a fruit and turning it in one direction until the desired solution is obtained.

This book is an introduction to reconstruction concepts and their applications for solving some network optimization problems. Networks are a mathematical abstraction of a given physical situation, which are described by using nodes, links (directed or non-directed) and link weights defining some associated properties of that physical system. Reconstruction ideas exploit the mathematical structure of a particular problem and find ways to reach the required solution. It is hoped that these ideas will be explored for other mathematical structures.

The authors have developed many methods to find optimal solutions for these network related problems and they observed that various methods discussed in 8 chapters have a common thread of reconstruction, which unites them, and that aspect motivated authors to develop this book.

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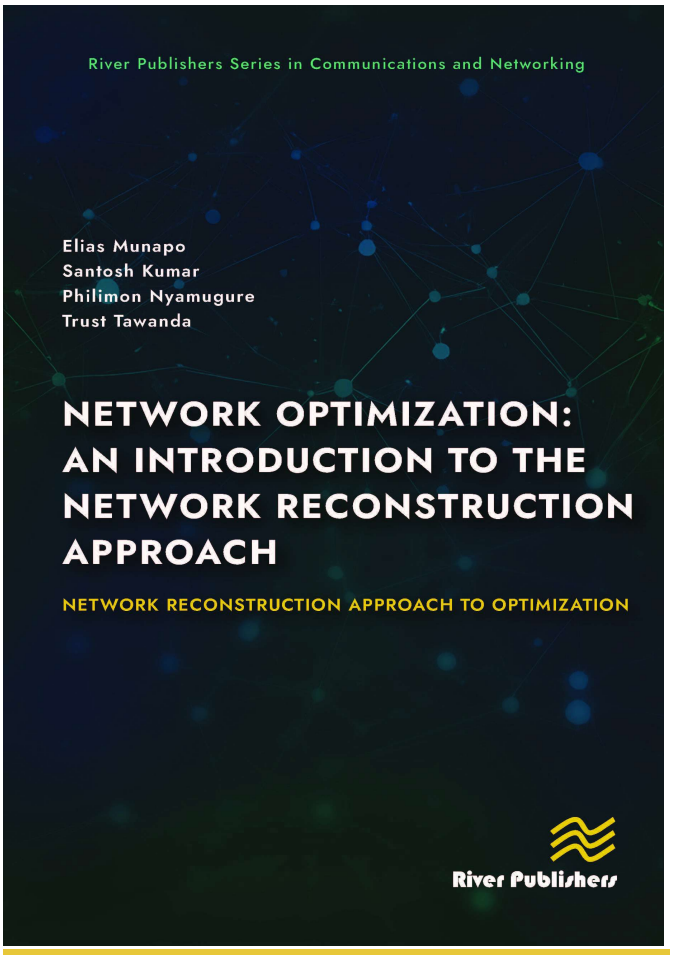

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KEYWORDS:
Assignment and transportation models, unification of assignment and transportation models, shortest connected graphs and index restricted shortest connected graphs, travelling salesman problem, reliability problems, flows in networks, shortest routes constraints to pass through a set of specified nodes, and the travelling salesman problem that raised a question, is the travelling salesman problem NP hard category need reconsideration.

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