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ABSTRACT
        This bibliography presents a series of studies that
focus on the topic of networks and on the manner in which they have
been considered in the literature. Each sec on of the bibliography
provides a working set of references for one of the five major areas
of research in which network analysis has been used. The first
section deals primarily with specifying the physical structure of
networks. Theoretical work describing various relationships between
nodes and arcs are listed as well as more empirical work that has
utilized and extended this initial body of theory. The second section
presents material dealing with the general problem of optimizing
flows through a given network. The third section considers
theoretical work that has been done to enumerate the total number of
possible graphs of a system, given a set of nodes and a set of arcs.
The fourth section looks at applied studies that use the theory of
graphs in an attempt to derive "optimal" networks. Finally, the last
section presents a series of studies that deal with the problem of
seeking optimal routes through a network. (Author/DN)

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NETWORK ANALYSIS: A SELECTED BIBLIOGRAPHY

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NETWORK ANALYSIS: A SELECTED BIBLIOGRAPHY

by

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Most of the work undertaken within the relatively new research area of Network Analysis relies very heavily upon a body of theory within topology known as graph theory. Many different types of problems are capable of being solved using this theory. Basic to all such problems is some type of graph consisting of a set of nodes connected by a set of arcs. Each of these arcs may be nominally scaled, representing connection or non-connection, or they may be weighted on the basis of some predetermined criteria so that importance of a connection may be ascertained. Such specification of a network or graph has facilitated use of the theory of graphs within at least five major areas of research. It is the intention of the bibliography to provide a working set of references within each of these areas. The list of references is by no means comprehensive in nature; that was not the intended design of the bibliography. With the recent increase in the numbers and types of studies dealing with networks, a need seems to have arisen for a compilation of some of the more visible work. This, then, is an attempt to present a series of studies which focus upon the topic of networks and the manner in which they have been considered in the literature.

As mentioned in the above statement the references will be divided into five sections. Because of the type of study some will be cross-referenced in one or more of the sections. Hopefully, this will

facilitate use of the bibliography. The five sections are titled:

I. Network Structure

II. Network Flows

III. Random Graphs

IV. Network Design

V. Network Routing

The first section deals primarily with specifying the physical structure
of networks. Theoretical work describing various relationships between
nodes and arcs are listed as well as more empirical work which has
utilized and extended this initial body of theory. The second section
presents material dealing with the general problem of optimizing flows
through a given network. The basic problem can most succinctly be
stated as follows. Given a network connecting a set of points, where
each connection has a capacity constraint (or a set of constraints
including cost and travel time), the problem is to select two cities
and find the maximal amount of flow possible from one of the cities to
the other using the entire given network. The third section is much
more limited in scope than the other four; empirical work within this
area is relatively unknown. Given a set of nodes and a set of arcs,
this body of theory attempts to enumerate the total number of possible
graphs of the system. The fourth section has recently arisen within a
more applied context. Most of these studies use the theory of graphs
in an attempt to derive "optimal" networks. Finally, in the last
section are presented a series of studies which deal with the problem
of seeking optimal routes through a network.

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