Telecommunication System Engineering

Analog and Digital Network Design

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Telecommunication System Engineering

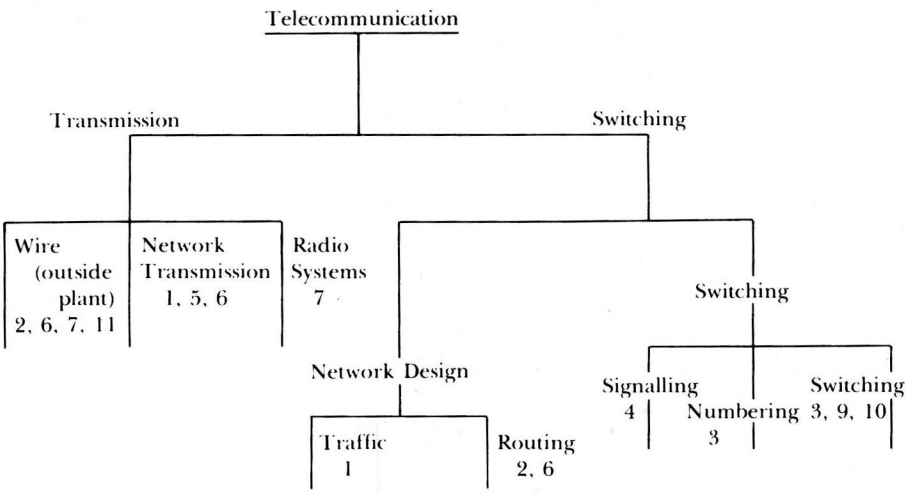
To my father, Andrew A. Freeman

PREFACE

The purpose of this text is to present the general engineering considerations necessary for the design of practical telecommunication networks. The majority of today's networks are built primarily to serve the telephone subscriber. These same networks are being more and more extensively used to carry other types of information such as data, facsimile, and video. The first seven chapters of this text deal with conventional telephony. The remainder of the book covers digital communication, in particular, data systems and digital telephony.

I define telecommunication as a service that permits people or machines to communicate at a distance. It involves many disciplines that work together to form a system.

Traditionally, telecommunication is broken down into two major categories of engineering: transmission and switching. Each major category in itself is broken down into well-definable specialties or disciplines as shown below:



(Numbers are chapter references)

The advent of data communications on the one hand, and digital telephony, on the other, caused the distinct separation of disciplines to become rather hazy and ill defined. In fact, with integrated digital telephone

networks and packet-switched data networks, the dividing lines disappeared almost entirely. The change is revolutionary.

I have organized the text to reflect both tradition and revolution. Conventional analog telecommunication has been with us since the late nineteenth century and will be with us for the remainder of the twentieth century at least. Digital systems are in their infancy and will mature over the next 20 to 30 years. My aim has been to give the reader a practical appreciation of both. Actually, I do not believe that a proper job of system engineering design can be done on a digital network without a solid background of conventional analog techniques.

ROGER L. FREEMAN

Sudbury, Massachusetts
February 1980

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R.L.F.

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