OVERFLOW TRAFFIC IN TELEPHONY

by

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SUMMARY

This thesis is concerned with an analysis of the Kosten and Brockmeyer overflow systems with renewal input.

Two models of teletraffic overflow systems are included. The first, or group model, considers an overflow system as either a G/N/M or G/N/L queueing system with an overflow stream as input. This overflow stream is produced by offering a renewal input stream to a finite primary group of trunks. The second, or atomic model, considers sequential overflow streams from individual trunks.

The atomic model is used to study such characteristics of an overflow stream as its peakedness and coefficient of variation. However, properties of the overflow traffic and the Laplace-Stieltjes transforms of the interoverflow distribution, developed by the first approach, are used to prove the overflow traffic factorial moment theorem.

A key feature of this thesis is the classification of traffic by its 'weakness', a new concept to telephony.

Explicit formulae for all offered and carried overflow traffic moments are derived in terms of finite differences of the overflow traffic's weakness, or equivalently, Laplace-Stieltjes transforms of the input renewal stream. The finite difference version is inverted to provide insight into the effect of specifying a finite number of overflow traffic moments on dimensioning teletraffic overflow systems.

A new dimensioning procedure, called the Equivalent Non Random Method, is developed in the final chapter.
4.4 Properties of Carried Traffic Moments
4.5 Connection Between Offered Traffic Moments
   and Carried Traffic Moments
4.6 Possible Divergence Between the Continuous
   Time and the Imbedded Markov Chain
   Occupancy Distribution

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CHAPTER IV
OVERFLOW TRAFFIC - ATOMIC APPROACH

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