MODELLING OF MULTI-SERVICE NETWORKS WITH OVERFLOW TRAFFIC

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The development of network control techniques based on traffic overflow has provided one of the basic methods that can be used in optimization of the usage of network resources with simultaneous provision of all the required quality parameters for individual traffic streams offered to the network. In the networks with overflow traffic two types of resources are used, i.e. direct resources and alternative resources. Calls that cannot be serviced by the direct resources are redirected to alternative resources. Alternative resources for given connections can comprise direct resources for other connections. The use of the alternative resources decreases the overall cost of the network and enables operators to extend its transmission capabilities without a simultaneous increase in the capacities of nodes and with the assumed traffic loss factor retained.

Initially, traffic overflow was used exclusively in traditional hierarchical telecommunications networks. Gradually, with the increase in popularity of radio networks, in which optimization of limited resources becomes a significant challenge, traffic overflow has been introduced to wireless networks of the second, third and fourth generation. The major difficulty that occurs during an analysis of systems with traffic overflow is to determine the demanded volume of alternative resources (with low losses). If we assume that a given distribution of time between calls offered to the primary resources (e.g. exponential distribution), then traffic that overflows from these resources will be of a different nature, because calls from an overflow stream can appear only during the total occupancy of the primary resources. If we assume identical value of the offered traffic and identical value of the blocking probability, then to execute service for the overflow traffic, a greater number of resources is required than that for the service of the traffic offered to the primary resources.

In this talk, the methods for analytical modelling of multi-service networks with implemented traffic overflow mechanisms will be elaborated and some numerical results will be shown

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Mariusz Głąbowski is the author/co-author of 4 books, 9 book chapters and of over 100 papers which have been published in communication journals and presented at national and international conferences. He has attended 40 conferences and workshops, and presenting 42 papers at these. His teaching in the Department of Electronics and Telecommunications, Poznan University of Technology, largely focuses on the M.Sc. and Ph.D. in Telecommunication where he gives lectures and conducts laboratory courses on Communication Network Design, Network Algorithms, Teletraffic Engineering, Programming in C++, and Algorithms and Data Structures. Mariusz Głąbowski also participates in industrial education acting as a lecturer in courses on communication network design, network simulation, routing and switching.