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Erlang's Ideal Grading in modeling modern telecommunications systems

Abstract: Erlang's Ideal Grading (EIG) is one of the oldest models of telecommunications systems that has been proposed within the domain of traffic engineering. The structure of the EIG group that services single service traffic and the corresponding analytical model were proposed by Erlang as early as 1917. The formula for a determination of the blocking probability in Erlang's Ideal Grading is called the Erlang's Interconnection loss Formula. Because of its complexity, the group had no practical applications for quite a long time. It was only in the 1970s that the EIG model started to be used in approximate modeling of other telecommunications systems, for it was observed that the characteristics of most of uniform non-full-availability groups executed in network nodes at the time were similar to those of Erlang's Ideal Gradings and could provide a basis for effective approximations to be used in engineering practice. Then, the model proposed by Erlang started to be used in modeling single service switching networks. Regrettably, the absence of an appropriate EIG model for multiservice traffic caused the EIG to have lost the interest of researchers. It was only at the turn of the twentieth and twenty first centuries, and thanks to the development of EIG models with multiservice traffic, that the EIG could be used again in modern telecommunications traffic engineering.
In my talk, a selected number of examples of the application of the EIG model for analyzing modern telecommunications systems will be described. The presented examples confirm the universal nature of Erlang's Ideal Grading model and the possibility of its application in engineering practice.

Biography: Dr Sławomir Hanczewski received M.Sc. and Ph.D. degrees in telecommunications from Poznan University of Technology, Poland, in 2001 and 2006, respectively. Since 2007 he has been working in the Faculty of Electronics and Telecommunications, Poznan University of Technology. He is an Assistant Professor in the Chair of Communications and Computer Networks. Slawomir Hanczewski is the author, and co-author, of more than 50 scientific papers. He is engaged in research and teaching in the area of performance analysis and modelling of queuing systems, multiservice networks and switching systems.