Mathematics of Communication

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Abstract

Modern communication technologies such as the Internet and mobile telephony look like great achievements of physics and engineering. They are! But these technologies would not function well without significant contributions of mathematics. Most of the mathematical methods employed are not just from the “bookshelf”; they have been developed in the recent years in conjunction with the deployment of the communication technologies.

In my lecture I will provide a broad survey of applications of mathematics in communication. These range from the design and production of cell phones, via encoding of signals and encryption of data, the design of cost-efficient survivable and robust fiber networks, to the assignment of channels to antennas for high quality mobile phone service. The mathematical methods used are, in particular, from statistical analysis, number theory, discrete mathematics and several areas of mathematical optimization.