

Theory of Linear Network Coding

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Abstract

In existing computer networks, information is transmitted from the source node to destination nodes through intermediate nodes by store-and-forward. There is no need of data processing at intermediate nodes except for data replication. In actual applications, there is always some form of data processing for such purposes as sanity, security, switching, etc. It is folklore, without technological or economical ground, that the data delivery process itself is precluded from the benefit of data processing at intermediate nodes. Surprising, this folklore was refuted only recently in a paper in 2000, where the concept of network coding is formally introduced.

Due to its generality and its vast application potential, the theory of network coding has generated much interest in information and coding theory, networking, switching, computer science, operations research, and matrix theory. New applications are identified frequently. This talk gives a tutorial on the basics of the theory with emphasis on achieving the best possible benefits of network coding simply with linear coding scheme.

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Degrees:

- BS (math), National Taiwan University, 1970
- PhD (math), University of California, Berkeley, 1974

Experience:

- Instructor in Applied Math at M.I.T., 1974-76
- Assistant Professor and then tenured Associate Professor of Math, Statistics and Computer Science at University of Illinois, Chicago, 1976-81
- R&D staff on switching and communications/computation principles, Bell Labs and Bellcore (currently Techcodia), 1979-90
- Professor of Information Engineering, The Chinese University of Hong Kong, 1989-present