Chair of Communications Engineering
TUM Department of Electrical and Computer Engineering
Technical University of Munich

TUM

Seminar

Capacity per Unit Cost

Gallager [1] studied the capacity regions of energy limited channels as in wideband and multi-access communication. He showed that reliable communication over such channels is fundamentally limited by a normalized rate, the capacity per unit energy. Verdu's capacity per unit cost [2] generalizes this concept to channels with arbitrary per-symbol cost functions. Since then, capacity per unit cost has been used to analyze a variety of communication scenarios in research literature.

The student will understand the concept and motivation of capacity per unit cost, and will be able to discuss the differences to Shannon's capacity result. The student will identify and review scenarios in literature where capacity per unit cost has been applied. Finally, the student will choose one of these applications and discuss in more detail how capacity per unit cost relates to this problem and how it helped in solving it.

References:

[1] R. G. Gallager, "Energy limited channels: Coding, multiaccess, and spread spectrum," Tech. Rep. LIDS-P-1714, Nov. 1987.

[2] S. Verdú, "On channel capacity per unit cost," IEEE Trans. Inf. Theory, vol. 36, no. 5, pp. 1019–1030, Sep. 1990.

Prerequisites

1. Strong background in Information Theory.
2. At least one of the following courses:

- Mobile communications.
- Multi-User Information Theory.
- MIMO Systems.

Advisors

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