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

Master's Thesis

Achievable rate of phase noise channels with memory

The nonlinear interference in optical channels can be modeled as a phase noise channel with memory (see [1] and references therein), i.e.

$y = x \cdot \exp(j\theta) + z$

where z is additive white Gaussian noise, and θ is a phase noise term with Gaussian distribution but correlated in time along several transmission symbols. The variance of this phase noise depends on the input constellation, making it harder to find the capacity of the channel.

The aim of this thesis is to study this correlated phase noise model and find achievable rates (lower bounds on capacity) analytically or through simulations.

[1] Ronen Dar, Meir Feder, Antonio Mecozzi, and Mark Shtaif, "Properties of nonlinear noise in long, dispersion-uncompensated fiber links," Opt. Express **21**, 25685-25699 (2013) [Online] Available: https://www.osapublishing.org/oe/abstract.cfm?uri=oe-21-22-25685

Prerequisites

Basic knowledge of information theory is a must.

Advisors

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