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Non-linear PNC mapping for hierarchical wireless network

Abstract - We discuss the requirements of a general (not necessarily linear) physical-layer network coding (PNC) mapping function for application in a network containing multiple sources and multiple relays. We consider the definition of linearity in such a mapping, then the requirements for unambiguous decoding of the output of the network, and finally the effect of singular fading in the links to a given relay. Hence we show how a mapping scheme can be designed for a specific topology and a specific set of channels. We note also however that such schemes are not likely to be readily compatible with a layered network coded modulation scheme, in which error control coding is separated from the network coding function.

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