Digital Information is not an Ordinary Commodity

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Abstract

We state and prove a lemma that has a number of consequences that all illustrates the theoretical utility of diversity coding. One consequence of the lemma can roughly be summarized as a theorem that states that many-to-many communication networks always can achieve the information theoretic limit. This results can be seen as a non-trivial extension of Yeung and Zhang's fundamental theorem for multicasting using Network Coding.

The diversity coding underlying our results is impossible to implement within traditional multicasting (e.g. IPv4 or IPv6-multicasting). Nevertheless, the theoretical limit identified by our theorems can be used as the *gold standard* that for many types of communication networks.

Inspired by our theoretical results we propose a new type of file distribution based on diversity coding that is build around *social network communities* where members share files and folders the are changed and updated in a many-to-many cast fashion. We argue that the benefits of the proposed file distribution scheme are most significant in networks with relatively low degree of connectivity.

I am currently circulating a draft version of the paper for general feedback. At the moment, this version is not for general distribution but is available by request