

# Abstract: Network Coding and Entropic Vectors

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Network coding is employed to push the capacity the the network above its maximum throughput defined by max flow algorithm. However, we would still like to understand the admissible region of the throughput of the network. In order to do this, the framework of entropic vector is introduced, which is a function  $2^{\mathcal{X}} \rightarrow \mathbb{R}$ , where  $\mathcal{X} = \{X_1, X_2, \dots, X_n\}$ , using entropy as the function. The theorem of how this region help to define the inner and outer bound of the admissible throughput is discussed in this talk. We then set out to discuss why how to characterize the set of entropic vectors. We first prove that the closure of the set is a convex cone. I will then show that it is a nontrivial question because the classical Shannon inequalities is not a tight bound for the region. Finally, I will show how group characterizable vector and quasi-normal distribution gives a good bound of the problem, but reduce the complexity of probability distribution, which might be useful in further characterizing the space.