**ETSMC004-2016-Optimal Conﬁguration of Network Coding in Ad Hoc Network**

**Abstract-**In this paper, we analyze the impact of network coding conﬁguration on the performance of ad hoc networks with the consideration of two signiﬁcant factors: the throughput loss and the decoding loss, which are jointly treated as the overhead of network coding. In particular, physical layer network coding and random linear network coding are adopted in static and mobile ad hoc networks (MANETs), respectively. Furthermore, we characterize the good put and delay/good put tradeoff in static networks, which are also analyzed MANETs for different mobility models (i.e., the random i.i.d. mobility model and the random walk model) and transmission schemes (i.e., the 2-hop relay scheme and the ﬂooding scheme). Moreover, the optimal conﬁguration of network coding, which consists of the data size, generation size and network coding Galois ﬁeld, is derived to optimize the delay/good put tradeoff and good put. The theoretical results demonstrate that network coding does not bring about order gain on delay/good put trade off or each network model and scheme except for the ﬂooding scheme in random i.i.d. mobility model. However, the good put improvement is exhibited for all the proposed schemes in mobile networks. To our best knowledge, this is the ﬁrst work to investigate the scaling laws of network coding performance and conﬁguration with thenetworks.