

Energy-Delay Tradeoffs in a Linear Sequence of Relay Channels

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Abstract:

In this paper we aim at characterizing the gain induced by using relay channels in a linear network under both a capacity constraint and a realistic energy model. We express a general model based on a convex optimization problem, allowing us to use numerical tools to obtain similar results for outer and inner bounds to the capacity of the full and half duplex relay channel. We then further the study with more complex networks based on relay channels, especially networks formed by a linear chain of nodes. We describe the Pareto optimal solutions of the minimization problem for with respect to the consumed energy and latency in such a linear network. From the simple case of the linear multi-hop network, we study the gains when implementing a linear chain of relay channels and compare these results to the simpler multi-hop transmission.