# Rateless Encoding for Video Streaming on Mobile Ad Hoc Networks

*Deepan Gandhi (deepang@stanford.edu)*
*Rohit Watve (rswatve@stanford.edu)*

Network types like wireless networks based on the Wireless LAN are becoming more popular and suitable for real-time transmission. Here we are considering scenario of peer-to-peer video streaming over mobile ad hoc networks. A multiple tree based system as in Peer-to-Peer Multicasting protocol described in [1] can be used, where retransmission is used for coping with packet loss.

Typically the uplink bandwidth is a bottleneck in these situations. Retransmission can then increase traffic, leading to congestion. Enough latency also has to be introduced in this scheme so that the node has time to send out retransmission requests and receive the lost packets, in case of sudden disconnection. In this scenario, multi-path routing as mentioned in the SPPM protocol, combined with rateless codes for forward error correction can be beneficial [2].

Rateless codes, e.g. Raptor codes [3], allow the encoder to form an unlimited number of code symbols for a single source symbol. If the source block length is k, then any k symbols out of these can be used by the decoder to obtain the block. Thus, these codes are ideally suited for erasure channels, where a number of intermediate code symbols may be lost.

We propose to mathematically model this scenario, taking into consideration the uplink bandwidth and disconnection probabilities. The initial model would neglect issues related to wireless channels. The mathematical model would then be compared with results obtained using the real-time implementation of SPPM. We would like to then compare the use of rateless codes with the ARQ system that is already present in Peer-to-Peer Multicasting protocol described in [1]. Since redundancy can be easily varied for rateless codes, we plan to optimize the redundancy taking into account the output video quality and latency, for a certain uplink bandwidth and disconnection probability. Furthermore, this technique may be further improved by using a scalable video codec, with different amounts of redundancy applied to different layers. This can provide a graceful degradation [4].

**References:**

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