Mordecai Golin, Hong Kong University of Science and Technology

"A Dynamic Programming Algorithm for Constructing Optimal "1"- Ended Binary Prefix-Free Codes "

We discuss the problem of efficiently constructing a minimum-cost binary prefix-free codes possessing the property that each of its codewords ends with a "1".

This problem was introduced in 1990, by T. Berger and R. W. Yeung. They defined a feasible or 1-ended code to be a prefix-free code in which every word is restricted to end with a "1". Such codes are used, for example, in the design of self-synchronizing codes,

Berger and Yeung derived properties of 1-ended codes, such as the relationship of a min-cost feasible code to the entropy of the source and then described an exponential (in n = number of codewords) time algorithm for constructing such codes. A few years later Capocelli, De Santis and Persiano gave another more efficient, but still exponential, time construction algorithm.

In this talk we describe an $O(n^3)$ time algorithm for constructing such a code. The method uses dynamic programming on truncated codes, or more specifically, on truncated trees, to build a min cost 1-ended code.