

DELAY AND ENERGY EFFICIENCY OF TREE ALGORITHMS WITH FREE ACCESS

Robbe Block, University of Antwerp, robbe.block@ua.ac.be

Benny Van Houdt, University of Antwerp, benny.vanhoudt@ua.ac.be

This paper presents a branching process approach to determine the main performance measures of a variety of conflict resolution algorithms known as tree algorithms with free access. In particular we present an efficient approach to calculate the mean delay, number of transmission attempts, collision resolution interval length and energy usage with arbitrary precision. A detailed discussion of the approach will be presented for the basic Q -ary tree algorithm under the standard information theoretical model, but the approach can be readily extended to many other settings, such as channels with variable packet lengths, channel errors, collision detection, etc.