Multi-Channel Tree Algorithms for LTE RACH Reliable High Throughput Access

Motivation:

LTE RACH is having problems against massive arrivals or frequent use of resources from machine type devices. This results in down time for RACH or large delays even when it is usable. Certain solutions are proposed to solve this problem for modifying the arrivals to the channel such as Extended Access Barring (EAB), Pre-Back-off, Back-off Modification, dynamic PRACH allocation and Tree Resolution. Out of all of this suggested solutions only Tree Resolution can guarantee reliable service of all users against sacrificing delay.

This thesis will investigate decreasing the latency thanks to using various single channel tree split algorithms that is available in the state of the art. Possible contribution can come from adaptation of this pre-split algorithms for multichannel slotted aloha for a better optimized performance.

Goals:

- Investigate various combination of Tree Split with Arrival Estimation Methods
- Run simulations and compare it with the analysis
- Optimize Tree Algorithms for LTE RACH

Prerequisites:

- Basic Medium access and Very Good Probability Backgorund
- Very Good (Any)Scripting language and C++

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