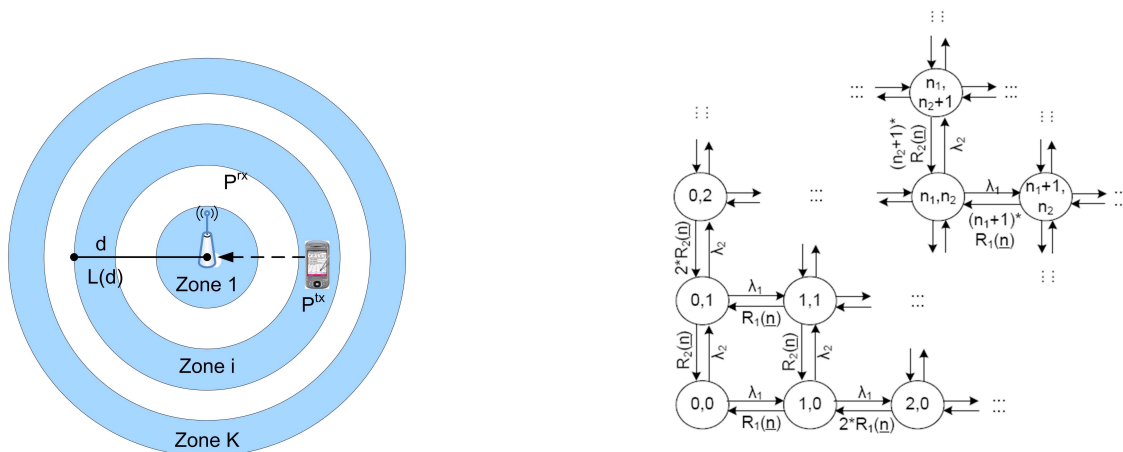


Performance evaluation for UMTS Enhanced Uplink with analytical techniques

Enhanced Uplink (EUL) is a new technology currently in vigorous research that will support even higher data rates on the uplink than UMTS R 99 can support. In order to achieve such higher data rates there are three major changes made in EUL compared to UMTS one of them being the used scheduling scheme. The scheduling scheme determines the order in which users are served (can transmit their data) and can be very divers. For mobile operators it is crucial to select the optimal scheme.

The current research on EUL consists of mathematical descriptions of the schedulers extended by Markov models to reflect the flow level dynamics. Until now, mostly simulation has been used for comparing different scheduling schemes. However, analytical approaches are usually much faster and more reliable.

The goal of the assignment is to use existing analytical techniques to compute steady-state and transient probabilities, on the above mentioned Markov models. The analytical results, computed with techniques as Mean-Field Analysis and the Sliding Window algorithm, can then be compared with existing simulation results.



The steps included in this research are:

- Get familiar with EUL/UMTS and the scheduling schemes and the environment in which the schemes operate.
- Get familiar with analytical techniques, i.e., Mean-Field Analysis and/or Sliding Window.
- Analyze the applicability of the analytical techniques to the Markov models, representing the different schemes.
- Define interesting measures that can be addressed with the above techniques.
- Compare analytical and simulation results and discuss the advantages/disadvantages of analysis versus simulation.

Related literature:

- Flow Level Performance Comparison of Packet Scheduling Schemes for UMTS EUL. D.C. Dimitrova, H. van den Berg, G. Heijenk, and R. Litjens.
- Mean-Field Analysis for the Evaluation of Gossip Protocols. R. Bakhshi, L. Cloth, W. Fokkink, B.R. Haverkort.
- Solving The Chemical Master Equation Using Sliding Window. V. Wolf, R. Goel, M. Mateescu, T.A. Henzinger.

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