Mobile Communications
Problem Set 7

Prof. Dr.-Ing. Markus Fidler
M.Sc. Felix Langenbruch

10.06.2016

1. Consider a p-persistent CSMA time slotted system with only two independent stations. A station tries to access the medium with probability p. Assume the vulnerability period $t_P = 0$ as well as all other overhead zero. The transmission time $t_T = x$ time slots. Use the renewal reward theorem to calculate the long term average reward, i.e., the system throughput. Find the optimal value for p to increase the long term system throughput.

2. Name, sketch and explain two modes of operation for wireless networks.

3. Why is time synchronization crucial for 802.11 Wifi networks? Explain the mechanism for synchronizing the internal node clocks in infrastructure 802.11 networks using a sketch.

4. Sketch and explain the functionality of the distributed coordination function (DCF). Explain the use of SIFS before acknowledgements. How do data collisions occur while the DCF is operating? What does the DCF implement to mitigate collisions?