THESIS ABSTRACT

Name: MOHAMED E. ELTAYEB

Title: OPPORTUNISTIC SCHEDULING WITH LIMITED FEEDBACK IN WIRELESS COMMUNICATIONS SYSTEMS

Degree: MASTER OF SCIENCE

Major Field: TELECOMMUNICATION ENGINEERING

Date of Degree: March 2009

In multiuser systems, multiuser diversity can be exploited by granting the channel resource to the user with the best channel condition. However, to make a scheduling decision, the base station requires the feedback of channel state information of all users. This feedback overhead can increase as the number of users or carriers increases, thus consuming system resources which could be utilized for data transmission. In this thesis, we investigate and propose scheduling techniques that can be employed to reduce this feedback overhead without significant degradation in system performance. To achieve this, we apply quantized feedback information with adaptive modulation and multiple probing thresholds to a polling based system. Closed-form expressions for the average feedback load and the average spectral efficiency are presented. Our numerical results show that our proposed schemes further reduce the feedback load when compared to the optimal scheme under the slow Rayleigh fading assumption. Other parameters such as average guard time, average system capacity, average system throughput, probability of access and scheduling delay are also investigated.

King Fahd University of Petroleum and Minerals, Dhahran.
March 2009