Simultaneous Rate and Power Control in Multirate Multimedia CDMA Systems

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We consider a wireless multimedia CDMA system, where the different mobiles transmit at different rates. We devise a method of simultaneously optimizing the power and rate at which the different terminals transmit for achieving their required quality of service (QoS). The QoS is defined to be the effective data rate which is different from the transmission rate. Optimization of power enhances battery life and optimization of data transmission rates facilitates in building cheaper and power efficient mobile systems. The joint optimization problem is formulated so that for a specified QoS, the total power transmitted by all the mobiles, and the sum of the transmitting rates of different mobiles can be minimized. The optimization problem is shown to be a non-linear and non-convex problem, but is solved to get a globally optimal solution using geometric programming. Results show that with optimized rates and powers, we can obtain better QoS than that obtained by present systems which use higher power.