

io-port 05028326

Eliaoud, Moncef; Hamdaoui, Bechir; Ramanathan, Parameswaran

Network-level qoS assurances through adaptive allocation of CDMA resources.

Wirel. Netw. 12, No. 1, 79-90 (2006).

Summary: In a Code Division Multiple Access (CDMA) network, multiple Mobile Hosts (MHs) can simultaneously transmit over the wireless channel by using different codes. To assure an acceptable Quality of Service (QoS) for all MHs' flows, the network usually tunes the transmit powers of all MHs to achieve a certain level of signal strength as compared to the noise and the interference (SINR) for each MH. The traditional assumption in power control schemes is that the SINR requirement is statically determined for each MH's flow. In contrast, in this paper, we propose a scheme that dynamically adapts the SINR requirements of MH's flow based on its QoS requirements and the conditions of the wireless channel between the MHs and the base station. As a result of this adaptation, we show that network-level QoS measures such as fraction of packets meeting their delay requirements and energy consumed per packet transmission are significantly better than in a scheme that statically fixes the SINR requirements. We show that the adaptation approach works well for the Matched Filter (MF) and the Minimum Mean Squared Error (MMSE) receivers. Our scheme uses a simple table-driven approach for optimally selecting the target SINR requirement for each MH at run time. The entries in the table are computed off-line using a dynamic programming algorithm with the objective of maximizing a profit function that balances the need for meeting the network-level QoS requirements and the cost of using a particular target SINR for a given transmission.

*Keywords:* adaptive allocation scheme; fixed allocation scheme; SINR; MMSE receiver; Matched Filter (MF) receiver; QoS; optimal profit function

doi:10.1007/s11276-006-6152-y