

# Adaptive Power Control of Cellular CDMA Systems via Optimal Predictive Model

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## Abstract

For direct sequence code division multiple access cellular radio systems, an autoregressive moving average model with auxiliary input (ARMAX) process is given to model the effects of round-trip delay, channel fading, and interferences (in-cell multiple access interference and out-of-cell interference) upon the power control system. According to the predictive model corresponding to the ARMAX model, a predictive adaptive power control scheme is proposed to compensate for the time delay and reduce the affects of channel fading and interference, thus achieving optimal tracking, in the sense of minimum mean square error control error, of the desired signal-to-interference-plus-noise ratio. Due to the optimal adaptive prediction scheme, the proposed adaptive power control method does not require the statistics of fading and interferences. Several simulation results are given to confirm the performance of the proposed method.

Keyword : Adaptive control process, autoregressive moving average processes with auxiliary input, code division multiple access (CDMA), power control.