# Robust H∞ power control for CDMA cellular communication systems

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## Abstract

Power control is an important factor for direct-sequence code division multiple access (DS-CDMA) cellular radio systems to achieve higher communication link quality and better system capacity. In order to track the desired signal-to-interference-plus-noise ratio (SINR) under round-trip delay, multiple access interference (MAI), channel fading, and noise, a time delay-based state-space model is developed for representing the tracking error dynamics and a state feedback controller is introduced for SINR tracking control. Then the power tracking problem can be regarded as a control problem. In this paper, a robust H∞ power tracking control design is proposed to achieve a robust optimal SINR tracking from the minimization of the worst-case effect point of view. This robust optimal power tracking design problem can be transformed to solving the eigenvalue problem (EVP) under some linear matrix inequality (LMI) constraints. The LMI Matlab toolbox can be used to efficiently solve the EVP via convex optimization to achieve a robust optimal SINR tracking design. Under the proposed distributed framework, the information of channel gain is not needed.

Keyword：Closed-loop power control, DS-CDMA, linear matrix inequality, robust H∞ control