Power Control of Cellular Radio Systems Via Robust Smith Prediction Filter

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Abstract

In this paper, a robust Smith prediction filter is proposed for power control design of direct-sequence code-division multiple-access cellular mobile radio systems. Due to the type-I (integrator) structure in the close loop, we first show that zero steady-state tracking error of the averaged received signal-to-noise plus interference ratio (SINR) with respect to a constant target SINR can be ensured. Next, with the Smith predictor to compensate round trip delay, a fixed-order robust H∞ loop filter is developed by using the genetic algorithm to minimize the worst-case variance of the received SINR from the minimax perspective. Using the proposed robust control approach, the statistics of the fading and interference are not needed in the design procedure. To confirm the performance of the proposed method, several simulation results are given in comparison with other methods.

Keyword：Genetic algorithm (GA), filter, H∞ robust power control, Smith predictor, Time delay compensation