

# Information–Theoretic Sum Capacity of Reverse Link CDMA Systems in A Single Cell, An Optimization Perspective

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## Abstract

The information–theoretic approach to maximizing the aggregate capacity of the reverse link in a CDMA system looks for the best pattern of transmission power of the stations. In this framework, where the transmission from each station is noise to all others, extra constraints should be considered to lead to a practically applicable solution. The previous research has suggested a minimum guaranteed quality of service plus bounds on individual transmissions and the aggregate one as constraints. However, extensive analysis has revealed that these two constraints are not enough to produce a solution which can be realized in an actual system. Basically, lack of any constraint including the maximum capacity of each station or dealing with the unfairness of the whole system has been found to be responsible for the partial solution in which all stations except for one are left to transmit at the lowest possible bandwidth, while the selected station is served with a non-realistic bandwidth of couple of hundreds more. In this paper we devise a maximum capacity constraint and give an algorithm for solving the problem. Then, empirical evidence are analyzed to show that the system actually becomes more balanced and practical when the new constraint is added.

*Key words:* Quality of Service, Single Cell, Reverse Link CDMA, Optimization.

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