

A Non-cooperative Uplink Power Control for CDMA Wireless Communication System

ABSTRACT

In this project, the main focus is to enhance the existing power control algorithm that is applied in a single cell of CDMA network. Nash algorithm is selected and is further improved with modification of its cost function with a value as power of target SINR, which to reduce the SINR error at first iteration, so as to increase the rate of convergence effectively. Decision of a value is important to ensure the SINR error is reduced at first iteration. The uniqueness and algorithm convergence of enhanced cost function is proven with certain conditions requirements. Therefore, enhanced Nash algorithm (ENA) is proposed which only applicable in first iteration of power control method. The rest of iterations are applied by Nash algorithm due to its better convergence to target SINR. After simulations, with consideration of Rayleigh and Rician fading channels, a significant increase in rate of convergence while maintaining the SINR with error less than 0.01 is shown. The transmitted power is lower in some scenarios, or with very slight reduction less than 0.5%. The SINR error at first iteration is reduced about 20% more by using ENA. In overall, ENA has better performance than the existing Nash algorithm in terms of transmitted power and rate of convergence, without compromising SINR.