

Cellular Mobile Radio Networks Design  
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Abstract

Two aspects of cellular radio systems design are covered in this work. First, is a way of evaluating a cellular system with a given configuration, including coverage, co-channel interference, and traffic capacity considerations. Second, based on this evaluation scheme, Simulated Annealing is used to improve the system performance by varying system parameters such as site channel assignment, site power, antenna azimuth, and antenna down-tilt. The main improvement of this work over previous reports is two-fold. First, calculations of the co-channel interference are direct. In comparison, a common practice is to use a compatibility matrix or similar measure for interference. A single number is then used to characterize the interference between a pair of sites / cells, which is an over simplification because interference varies for different points in the cell served by a site. It is the collective results of all other cells using the co-channel and not only just between the two sites. Furthermore, interference in both directions, uplink and downlink, need be included. Uplink is the weaker link in general and is commonly ignored in the compatibility matrix. The second improvement is that the entire area distribution of traffic is used in this work as opposed to the common practice of using total traffic at each site.

Keyword : coverage; co-channel interference; cellular system