Abstract

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"Development and Simulation of Neural-Network Based Adaptive Receivers for Multi-user Asynchronous CDMA transmission Systems."

The continuous development of telecommunication systems able to satisfy the demands of a growing number of users, asking for a continuously increasing range of multimedia services, has yielded to study more and more advanced and efficient transmission techniques.

In particular it has been considered the development of satellite transmission with receivers that are able to demodulate many different kinds of information coming from different sources.

From this point of view techniques able to transmit a variable quantity of information are needed, without temporal or bandwidth limitations. The CDMA, in this sense, allows, to a certain number of users to transmit information over the same channel, in an asynchronous way, accepting the tradeoff involved by a form of auto-interference, due to the imperfect orthogonality of codes.

This kind of noise, called Multiple Access Interference (MAI), is the true bottleneck of the CDMA systems. Many techniques of multi-user detection are been presented in literature, for deleting or reducing the MAI.

This thesis deals with the study of asynchronous CDMA multi-user receivers, that use artificial neural networks, developing a system that is able to provide performances that are in line with those owns of others techniques, used for the multimedia transmission.