

An Intelligent Scheme Switching for MIMO Systems Using Fuzzy Logic Technique

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Abstract : Link adaptation is an important strategy for achieving robust wireless multimedia communications based on quality of service (QoS) demand. Scheme switching in multiple-input multiple-output (MIMO) systems is an aspect of link adaptation, and it involves selecting among different MIMO transmission schemes or modes so as to adapt to the varying radio channel conditions for the purpose of achieving QoS delivery. However, finding the most appropriate switching method in MIMO links is still a challenge as existing methods are either computationally complex or not always accurate. This paper presents an intelligent switching method for the MIMO system consisting of two schemes - transmit diversity (TD) and spatial multiplexing (SM) - using fuzzy logic technique. In this method, two channel quality indicators (CQI) namely average received signal-to-noise ratio (RSNR) and received signal strength indicator (RSSI) are measured and are passed as inputs to the fuzzy logic system which then gives a decision – an inference. The switching decision of the fuzzy logic system is fed back to the transmitter to switch between the TD and SM schemes. Simulation results show that the proposed fuzzy logic – based switching technique outperforms conventional static switching technique in terms of bit error rate and spectral efficiency.

Keywords : channel quality indicator, fuzzy logic, link adaptation, MIMO, spatial multiplexing, transmit diversity

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