Throughput improvement of SR-ST ARQ protocols operating in multipath fading affects channels

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Wireless networks based on the IEEE 802.11 WiFi technology have evolved as a cost effective solution for accessing mobile networks or the Internet in different places. Such access networks are typically characterized by highly varying channels. Because of the variability of the channels, bit error rate increases. Hence, to make these networks a reliable access technology, it is necessary to design schemes that suppress noise and the fading effect and thereby improve the links' throughput. In this dissertation, selective repeat with stutter (SR-ST) ARQ scheme with diversity combining together with packet size adaptation has been proposed. The study used IEEE 802.11n as a reference standard in the development of effective scheme. The aim was to provide maximal achievable throughput when a diversity combining technique employed under multipath fading channel conditions. The diversity technique used the combination of maximum ratio combining and spatial diversity. Packet size adaptation used to control the receiver buffer overflow and maintain optimal throughput. Both spatially uncorrelated and correlated antenna branches were investigated for identical and non-identical channels. The simulation results have shown that diversity gain of order of 10dB obtained from the combination of maximum ratio combining and spatial diversity improved overall throughput performance by 40%. It also it has been seen that significant throughput improvement can be achieved by using Selective Repeat with Stutter ARQ instead of Stop-and-Wait ARQ, which is currently used in IEEE 802.11 WiFi technology.