

Development of a Novel Data Link Protocol for the 3rd Generation Mobile Communication System UMTS

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Abstract

In the current UMTS specification groups it is discussed to what extent enhanced ARQ techniques will be included in future releases of the standard. The task of this thesis is to give more information on different ARQ possibilities for the decision process.

An adaptive Type-I Hybrid ARQ system referred to as link adaptation is compared with different Type-II Hybrid ARQ schemes in terms of throughput characteristics, delay performance, memory requirements, and complexity. These results were obtained by software simulations which were implemented according to the current standard and specified test environments for UMTS.

Results showed that even a simple link adaptation approach is clearly superior to the current system. The employed Type-II Hybrid ARQ schemes improve the throughput behavior compared to the link adaptation method even further, but increase the complexity especially due to additional memory requirements in the physical layer. Astonishingly, considering bursty traffic sources, also the delay characteristics of Type-II Hybrid ARQ have better properties than the link adaptation system.