

305. HYBRID DETECT-AND-FORWARD RELAYING AIDED COOPERATIVE SPATIAL MODULATION FOR WIRELESS NETWORKS WITH CHASE DETECTION

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A novel detect-and-forward (DeF) relaying aided cooperative SM scheme is proposed, which is capable of striking a flexible tradeoff in terms of the achievable bit error ratio (BER), complexity and unequal error protection (UEP). More specifically, SM is invoked at the source node (SN) and the information bit stream is divided into two different sets: the antenna index-bits (AI-bits) as well as the amplitude and phase modulation-bits (APM-bits). By exploiting the different importance of the AI-bits and the APM-bits in SM detection, we propose three low-complexity, yet powerful relay protocols, namely the partial, the hybrid and the hierarchical modulation (HM) based DeF relaying schemes. These schemes determine the most appropriate number of bits to be re-modulated by carefully considering their potential benefits and then assigning a specific modulation scheme for re-laying the message. As a further benefit, the employment of multiple radio frequency (RF) chains and the requirement of tight inter-relay synchronization (IRS) can be avoided. Moreover, by exploiting the benefits of our low-complexity relaying protocols and our inter-element interference (IEI) model, a low-complexity modified chase detector is proposed for jointly detecting the signal received both via the source-destination (SD) and relay-destination (RD) links. Chase detector can achieve better ML performance with lower complexity, which is combined by a list detector and a parallel bank of sub-detectors. Because of the existence of error propagation, the orders of symbol detection are critical in Chase detection. An improved multistage Chase detector is proposed here for reducing error spread based on maximum likelihood (ML) detection and order method, that can trade-off performance and complexity by setting parameters at different values, Simulation experiment results show the validity of proposed algorithm.

Index Terms—Cooperative diversity, detect-and-forward relaying, hierarchical modulation, spatial modulation, space-time shift keying.