LATTICE-REDUCTION AIDED MULTI-USER STBC DECODING WITH RESOURCE CONSTRAINTS

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Abstract:

Recently lattice-reduction aided decoders have been proposed in MIMO system to achieve near Maximum Likelihood decoder performance while maintaining reasonable complexity. This paper studies the implementation of lattice-reduction aided linear decoders on a programmable device for multi-user space-time block coding (MU-STBC). By reloading software, the device can be configured to use different decoding schemes according to the amount of resources available, which is an important feature of cognitive radio. In this paper, two different lattice-reduction aided linear decoding methods namely SQRD-LR and AQRD-LR for MU-STBC are evaluated based on their BER performance and computational complexity. Furthermore, the effect of deadline constraint on LR is evaluated and based on the evaluation, a new method namely adaptive decoding is proposed by us to allow mode-switching of the decoder according to the environment parameters, so that the best decoder performance can always be achieved while fulfiling the resource constraints.