

V-BLAST Reception for BeamSpace MIMO Systems with Limited Feedback

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Abstract:

BeamSpace MIMO (BS-MIMO) is a newly proposed transmission technique that can successfully overcome the two significant disadvantages of conventional MIMO. More specifically, BS-MIMO using Electronically Steerable Passive Array Radiators (ESPAR) achieves similar multiplexing and beamforming capabilities using a single RF chain. Moreover, it is proved that BS-MIMO benefits from the use of small sized antenna arrays outperforming in terms of capacity conventional MIMO systems that operate poorly due to spatial correlation. However, the open issues towards an implementable, fully functional BS-MIMO system are still plenty. This study is part of a series of research work that focuses on real-world BS-MIMO system design. The application of limited feedback techniques in BS-MIMO is introduced and the performance of the developed algorithm is evaluated. These results are also used to derive conclusions regarding the adaptivity requirements for the parasitic elements of the ESPAR antenna. Moreover, a practical V-BLAST reception scheme using receiver radiation pattern adaptation is also presented. Finally the performance of this reception scheme is compared with ideal reception in BS-MIMO.