

Report on "Wideband fading channels with feedback" by Shashi Borade and Lizhong Zheng ,IEEE TRANSACTIONS ON INFORMATION THEORY, VOL. 56, NO. 12, DECEMBER 2010.

This paper considers Rayleigh flat fading channel at low SNR and obtains a number of capacity results (in the asymptote of SNR approaching 0) for various scenarios. This SNR regime is of particular interest as the knowledge of CSI at the transmitter can dramatically increase the capacity (even though the rate approaches zero). The scenarios considered include (i) full CSIT/CSIR, (ii) one bit CSIT, no CSIR, (iii) noisy CSIT (or one bit about noisy CSIT), (iv) block fading with coherence time T , no prior CSIT/CSIR. For cases (i)-(iii) capacity is established, for case (iv) a training based achievability is proposed and is shown to be the capacity for power-control-only feedback.

I agree with the nominator that a major strength of the paper is the simplicity and the elegance of the results, and the many engineering insights the authors provide. The result on one-bit feedback being sufficient is quite nice. However, while this is a very good paper, I am not sure whether it is award quality. I did not find the solutions nearly as comprehensive and groundbreaking as the ones in prior IT award winners.