UNIVERSITI TEKNOLOGI MARA

IMPLEMENTATION OF 16-QAM ALAMOUTI ENCODER ON FPGA FOR MIMO TESTBED

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ABSTRACT

There are 2 general objectives of Multiple Input Multiple Output transmission system; i.e. spatial multiplexing and spatial diversity. Diversity gain in MIMO is achieved by incorporating Space Time Block Code (STBC) in the transmission system. It is identified that there is lack of continuation from theoretical study of STBC towards its practical hardware design on MIMO testbed. It is desirable if more research area can be explored in experimenting STBC codes with different configuration such as decoding algorithm, modulation scheme, equalization technique, forward error correction and channel estimation. Many performance evaluation experiments can be conducted in real environment to investigate many schemes from practicality point of view. In this project, a fully orthogonal STBC namely, Alamouti codes is implemented on Polarizone MIMO Testbed platform for data encoding and RF transmission purposes. The Polarizone MIMO Testbed's system architecture is studied and the methodology to implement encoding system on the platform is proposed.The detail architecture and algorithmic state machines for important modules is explained in detail. Finally the system is executed on Polarizone MIMO Testbed and data acquisition is performed for system verification. The Alamouti Encoder is implemented on MIMO Testbed successfully and the system is proven to work in real environment.

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