

Stephen  
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## An Implementation of Discrete Multi-tone Over Slowly Time-Varying Multiple-Input/Multiple-Output Channels

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*A. Maleki-Tehrani, A. Hassibi, S. Boyd, and J. Cioffi*

*Proceedings IEEE Global Telecommunications Conference, 5:2806-2811, 1998.*

- [mimodmt.pdf](#)

Recent analysis of Multiple-Input Multiple-Output (MIMO) communication systems, for example those involving antenna arrays, has shown that channel capacity increases linearly with the number of antennas. This motivates the investigation of methods for data transmission over slowly time-varying MIMO channels. A low complexity method is introduced that effectively diagonalizes the MIMO channel. This enables the use of Discrete Multi-Tone (DMT) modulation over the MIMO channel to achieve information transmission rates close to Shannon capacity. DMT requires knowledge of the channel state information at the transmitter which is not always possible in practice. In this case the channel can be only made block diagonal and signal detection requires the solution to a least-squares problem with integer variables. This is a very challenging problem that is theoretically difficult (NP-hard). In this paper, a practically efficient method is proposed to solve this least-squares problem.