System Model

Channel Model

Introduction

Problem Description

Relevant Work in the Literature

Based on the perfect (or estimated) CSI, from the codebook that has the maximal elements, we can

Channel Model

Multicarrier solutions

In each step, project the analog matrix to the nearest (in Euclidean sense) matrix of the required set

OMP

In each of the $N$ steps, choose a vector from the codebook that has the maximal projection on the remains of the matrix being decomposed.

In each step, project out the selected vector

OMP Decomposition, Statistical Channel Model

BCD Decomposition, Statistical Channel Model

OMP Decomposition, Measured Channels

BCD Decomposition, Measured Channels

Discussion

A practical solution for wideband linear precoding/combining has been presented

A reduced set of subcarriers can be used for designing the analog transmit/receive strategy — reduction of complexity

The choice of the decomposition algorithm is remarkably important

Future work should consider channel estimation

(Kim et al. et at. “DFT Basis Channel Estimation and Equalization for Hybrid Analog-Digital Millimeter-Wave MIMO systems”)