

Review of the Book “Advanced MIMO System”

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This book concerns most of recent advances of the multiple-input multiple-output (MIMO) system. An outstanding feature of author' approach is equal attention to both the theoretical analysis and practical application involved in this system. A series of important research results from the polarized MIMO systems to antenna selection in MIMO Systems are discussed in detail in the paper, which are all well-organized and adequately supported by the elaborate figures and data.

In Chapter 1, the author offers a concise review of the most known multiple antenna MIMO techniques including single-user point-to-point systems and multiuser systems, and elaborates how multiple antennas help provide diversity and multiplexing to the detection techniques, which provides the adequate background knowledge to the readers.

The Chapter 2 deals with the modeling, analysis, and

simulation of multiple-input multiple-output (MIMO) narrowband fading channels for mobile-to-mobile communications. Although the readers can acquire much insightful information about the complex channel and their statistical properties, the most important gain of this section is that it presents a universal framework for the designers of future mobile-to-mobile communication systems to verify new transmission concepts that employ MIMO techniques under realistic propagation conditions.

After presenting a brief recall of the information theory that is early used to investigate the capacity of multiple antenna systems in the Chapter 3, the author focuses on the synchronization framework and algorithms for MIMO systems, especially for frequency synchronization in Chapter 4, which will present very useful information to the researchers who are interested in the frequency synchronization.

Chapter 5 refers to the realization of the STBC MIMO systems which interest me mostly. As is well known, the performance of a wireless communication system can be substantially improved by implementing MIMO systems. MIMO signaling can improve wireless communication in two different ways: diversity methods and spatial multiplexing. Diversity methods can improve the robustness of the communication system in terms of BER by exploiting the multiple paths between transmitting and receiving antennas. Another MIMO technique, spatial multiplexing, focuses on the target of sending parallel independent data streams and achieving overall system capacities.

Regardless of being used as diversity or spatial multiplexing system, the main drawback of any MIMO system is the increasing of the complexity, size, and price that scales with the number of antennas. Since antennas are generally cheaper than relative electronic devices mentioned above, antenna selection becomes a promising approach to reduce hardware complexity while capturing many of the advantages of MIMO system. The antenna selection not only reduces the number of required RF chains from N to L , but also leads to significant savings.

There are many interesting topics about the antenna selection worthy to be studied. In this chapter, the authors investigate the application of antenna selection

technique into STBC MIMO wireless communication systems over Rayleigh fading channels and then provide the performance analysis of such as MIMO systems. The authors also carry out Monte Carlo simulation to further detect the accuracy of both analytical expressions. All of these materials are clear and understandable with the elaborate figures and detailed discussion, which will help the readers greatly to capture the major progress of this area.

Subsequent chapters refer to the other topics of the MIMO-OFDM channel estimation, polarization diversity, Cooperative Systems for Sensor Networks and discussion that concerns the impact of using MIMO physical channel on the MAC and network layers.

I believe the book will present many interesting contents to the readers and help them follow the recent progress of this new and booming area.

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