

Introduction to Smart Antennas

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ABSTRACT

As the growing demand for mobile communications is constantly increasing, the need for better coverage, improved capacity and higher transmission quality rises. Thus, a more efficient use of the radio spectrum is required. *Smart antenna systems* are capable of efficiently utilizing the radio spectrum and, thus, is a promise for an effective solution to the present wireless systems' problems while achieving reliable and robust high-speed high-data-rate transmission. The purpose of this book is to provide the reader a broad view of the system aspects of smart antennas. In fact, smart antenna systems comprise several critical areas such as individual antenna array design, signal processing algorithms, space-time processing, wireless channel modeling and coding, and network performance. In this book we include an overview of smart antenna concepts, introduce some of the areas that impact smart antennas, and examine the influence of interaction and integration of these areas to *Mobile Ad-Hoc Networks*. In addition, the general principles and major benefits of using space-time processing are introduced, especially employing multiple-input multiple-output (MIMO) techniques.

KEYWORDS

Adaptive arrays, Switched-beam antennas, Phased array, SDMA, Mutual coupling, Direction of arrival, Adaptive beamforming, Channel coding, MANET, Network throughput, Space-time processing.

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