

Preface

In wireless communication systems, In-phase and Quadrature (IQ) modulator and demodulator are usually used at transmitter (TX) and receiver (RX), respectively. For Digital-to-Analog Converter (DAC) and Analog-to-Digital Converter (ADC) limited systems, such as multi-giga-hertz bandwidth millimeter-wave systems, using analog modulator and demodulator is still a low power and low cost solution. In this kind of systems, the IQ imbalance cannot be ignored. Numerous papers have been published to investigate this problem. However, depending on different assumptions, different models of IQ imbalance are built and different approaches are proposed. This makes the researchers and system design engineers who are new to this topic difficult to start with. The goal of this book is to provide a unified IQ imbalance model and systematically review the existing estimation and compensation schemes. The intended audience of this book is the researchers who are interested in the IQ imbalance as well as the system design engineers who need to deal with the IQ imbalance in their systems.

The book starts with a unified IQ imbalance model, and then investigates the methods that are used in estimation and compensation. Since different methods may depend on different system assumptions, application scenarios, and implementation architectures, it is difficult to compare the performance in a fair setup. So, when discussing these methods, the book mainly focuses on the mathematical derivations. The hope is that after reading this book the readers can find an existing method or devise a new one that is more suitable for the systems they are going to design. Due to the limited space and time, and also the limited knowledge of the author, the method discussed in this book is far from extensive, and only literatures that the author is familiar with are included. The author would like to apologize if any important literatures are missing in the references.

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