

Diversity Techniques for Multipath Fading

MSEE Scholarly Paper by Justin Cook

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Date and Time: Wednesday July 9th, 5:00pm

Location: ECE Conference Room 230

Abstract

In the past ten or so years, communications technology has been developing at an extremely rapid pace. Some of our models that we use when designing communications systems rely on fundamental assumptions about the underlying background processes at work. This paper will explain the fundamentals of diversity techniques and how modern channel models necessitate taking these techniques into account. We will start by introducing the standard Additive White Gaussian Noise channel model, and then extend it by considering Multi-Path and Fading. After introducing the standard impediments to communication we will discuss several ways in which we try to compensate our schemes to allow us to be able to communicate effectively even in bad channel conditions. We will then consider a novel approach called Space-Time Adaptive Processing, which is a relatively new class of diversity schemes design to deal with these particular challenges.