Final Year Project

Effects of ISI on Equal Gain Combining and Maximal-Ratio
Combining with Sub-Optimal Design

Yann Donnelly
University College Cork

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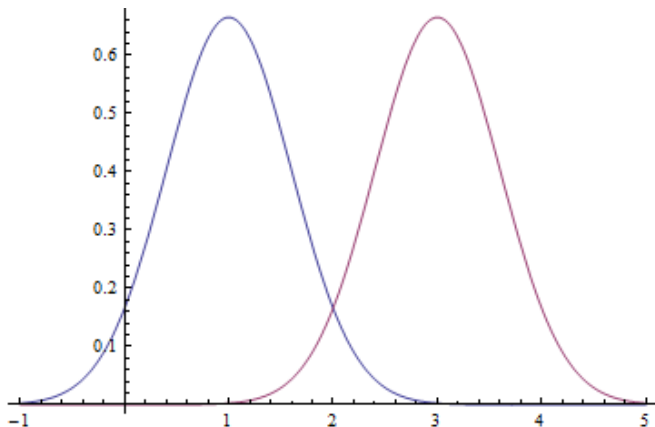
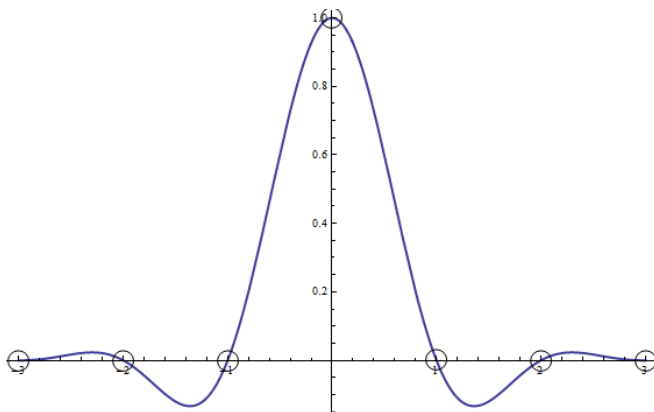# INTRODUCTION

A TYPICAL COMMUNICATIONS SYSTEM
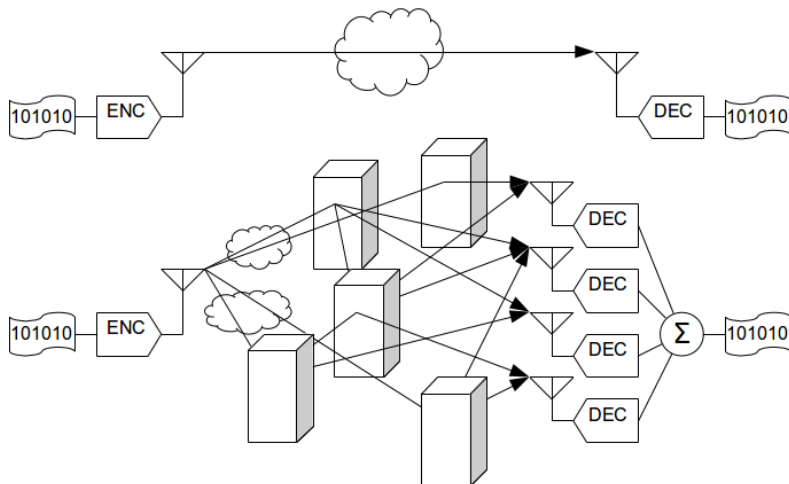
DETECTION BASICS

Likelihood of receiving a signal

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Received signal response

DETECTION BASICS

Received signal response with timing error
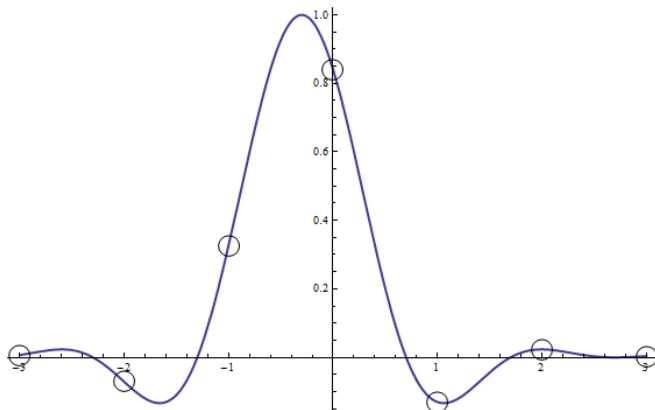
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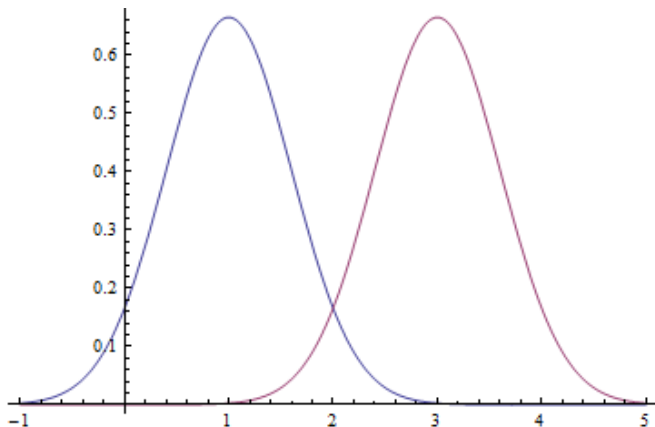
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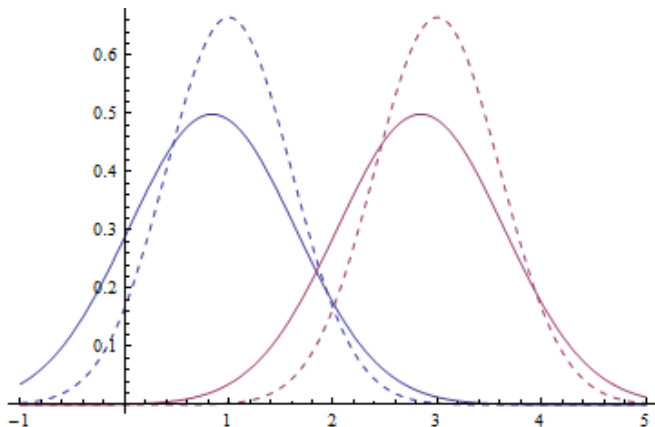
AIMS OF PROJECT

To determine the effects of Tikhonov-distributed timing offset on receiver performance, and develop a means of improving performance through redefining the decision region boundaries.

ACHIEVEMENTS

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- Examined performance in Rayleigh fading environment with EGC
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- Positive results:
  - Lower optimum decision region boundaries in the presence of timing error
  - Performance increase from redesigning detector to take this into account

RESULTS

- ▶ EGC: Improvements of 20-33%
- ▶ MRC: Improvements of 7-20%

Error Rate, SNR = 20dB
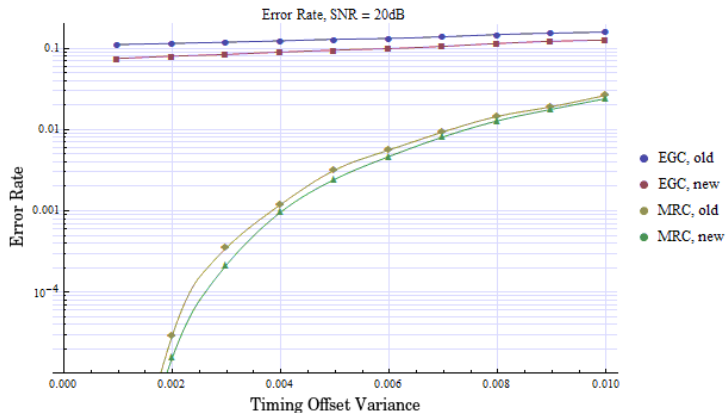
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    - Solution: Functions with memory
    - Solution: Parallel computing

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- ▶ Running simulations across multiple machines that can be switched off at any point
  - ▶ Solution: Output regularly
  - ▶ Solution: Make sure outputs are descriptive
  - ▶ Solution: Easily reconfigurable code

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