Final Year Project

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

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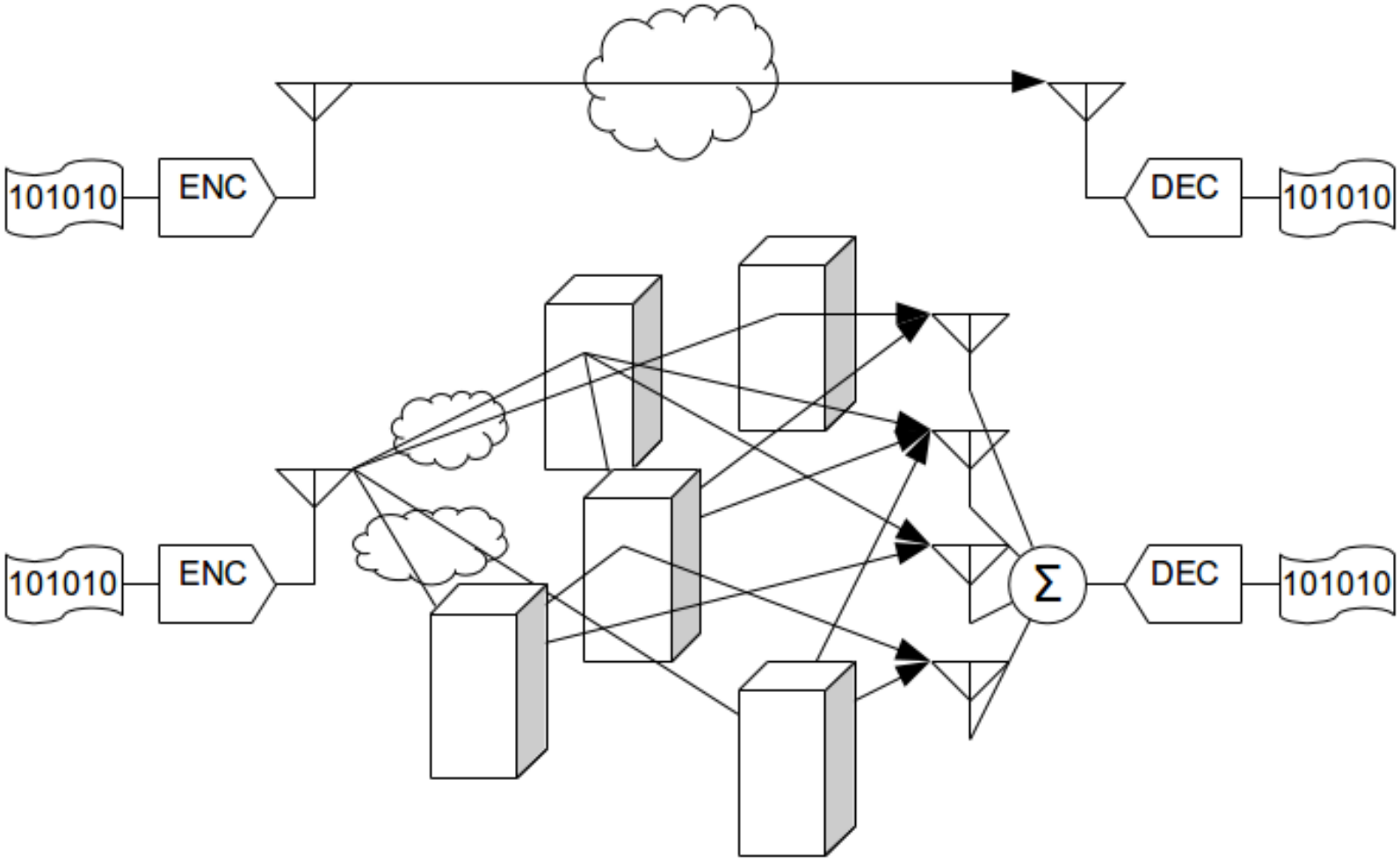
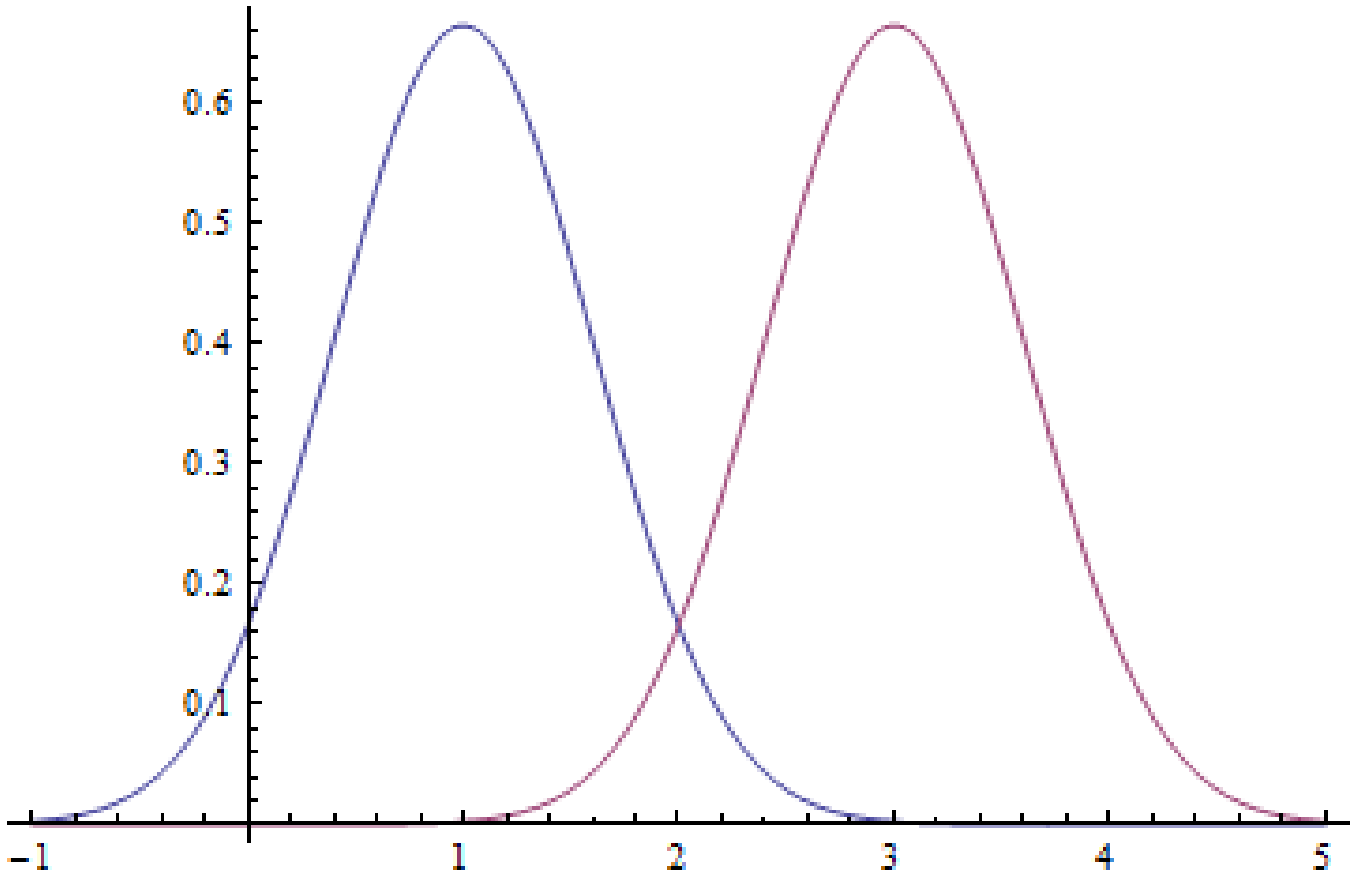
Introduction

A TYPICAL COMMUNICATIONS SYSTEM



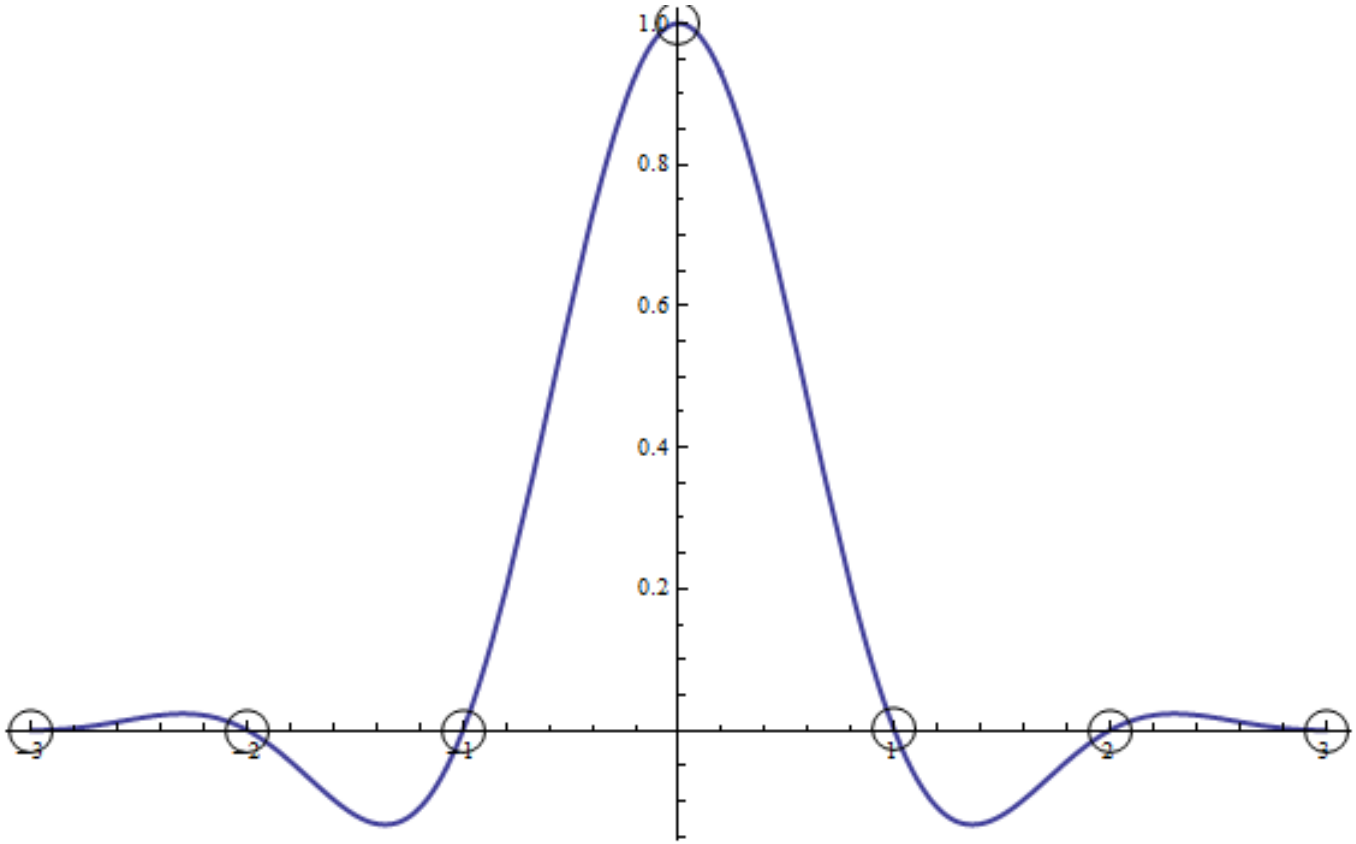
DETECTION BASICS

Likelihood of receiving a signal



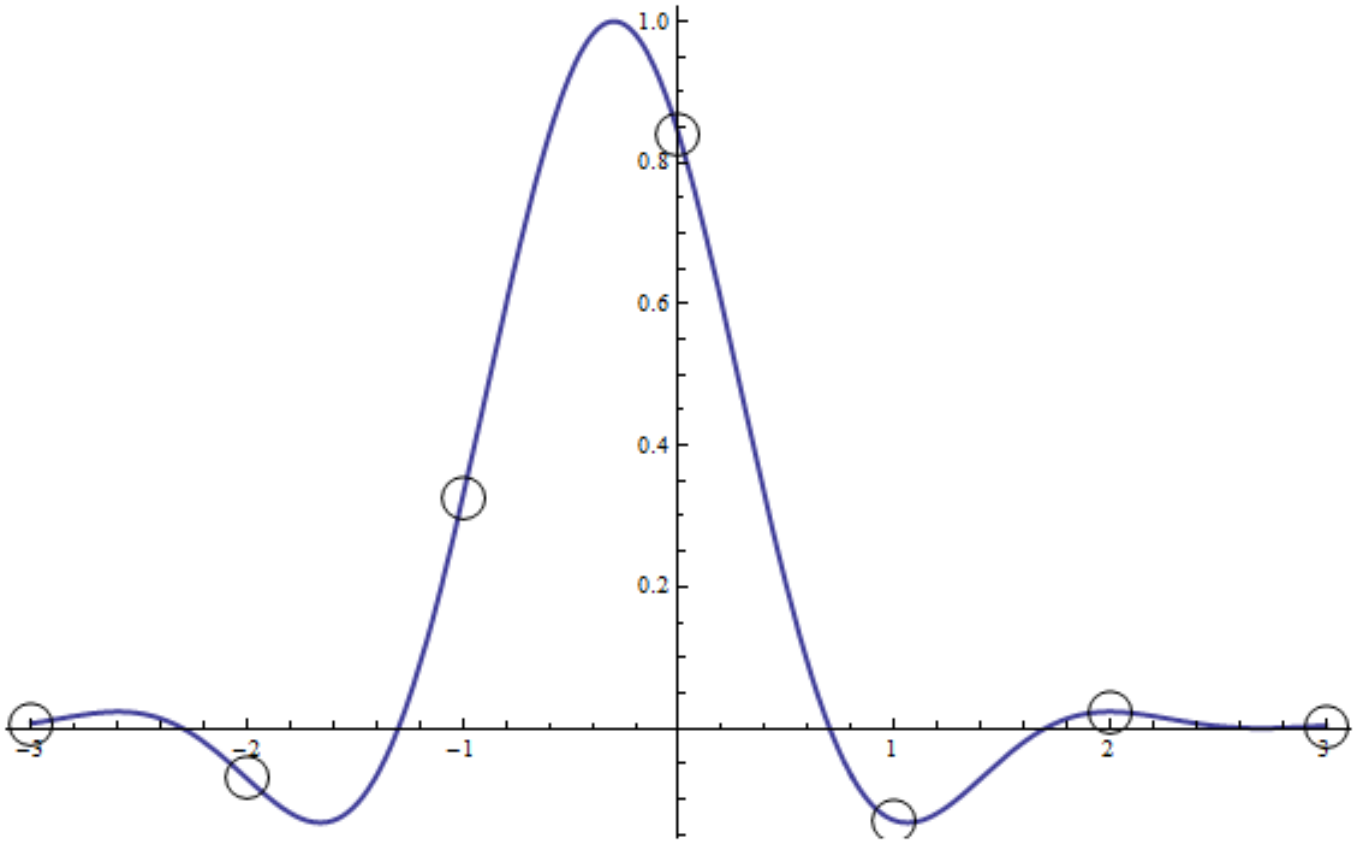
DETECTION BASICS

Received signal response



DETECTION BASICS

Received signal response with timing error



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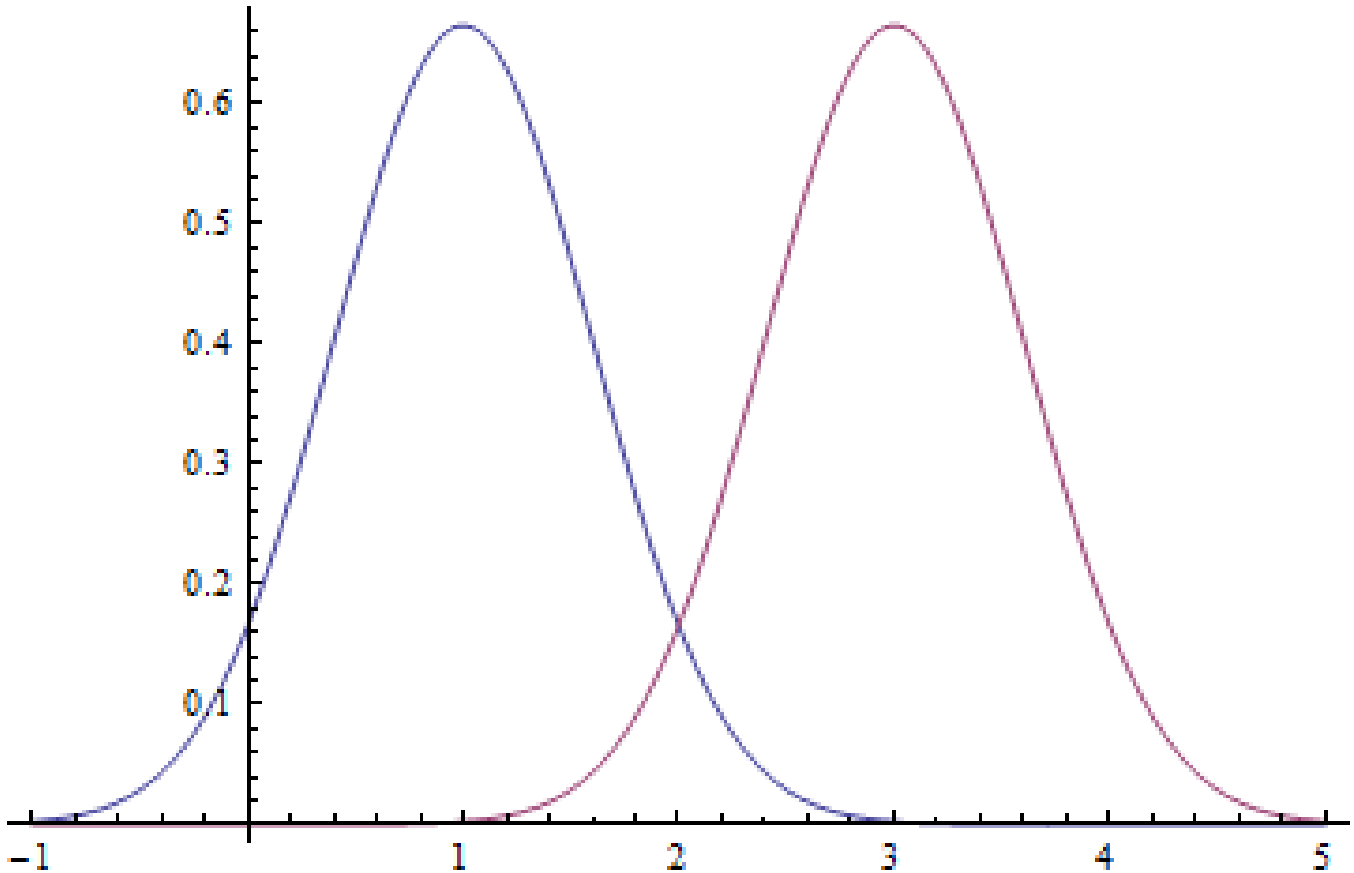

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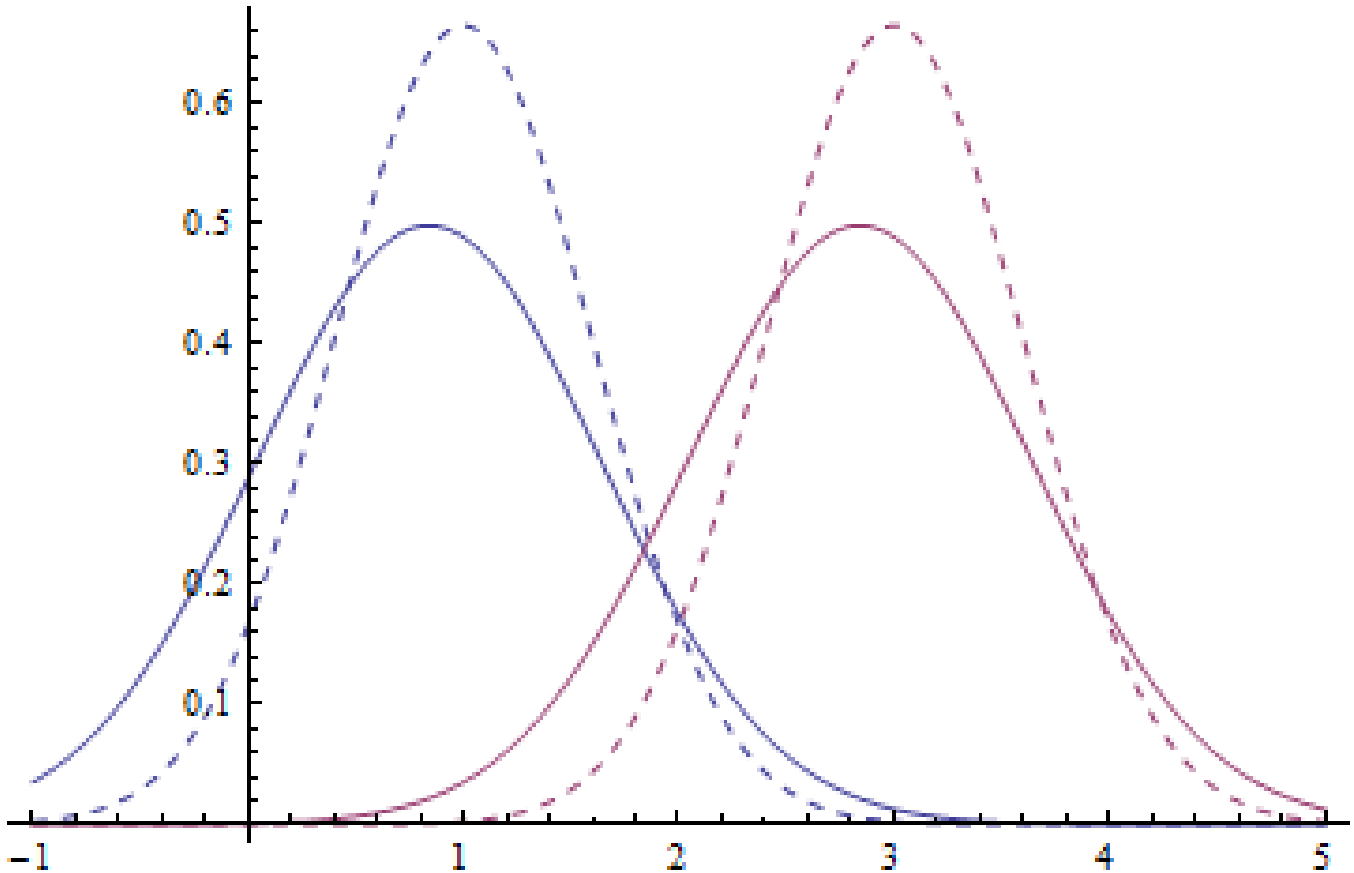

AIMS OF PROJECT

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.

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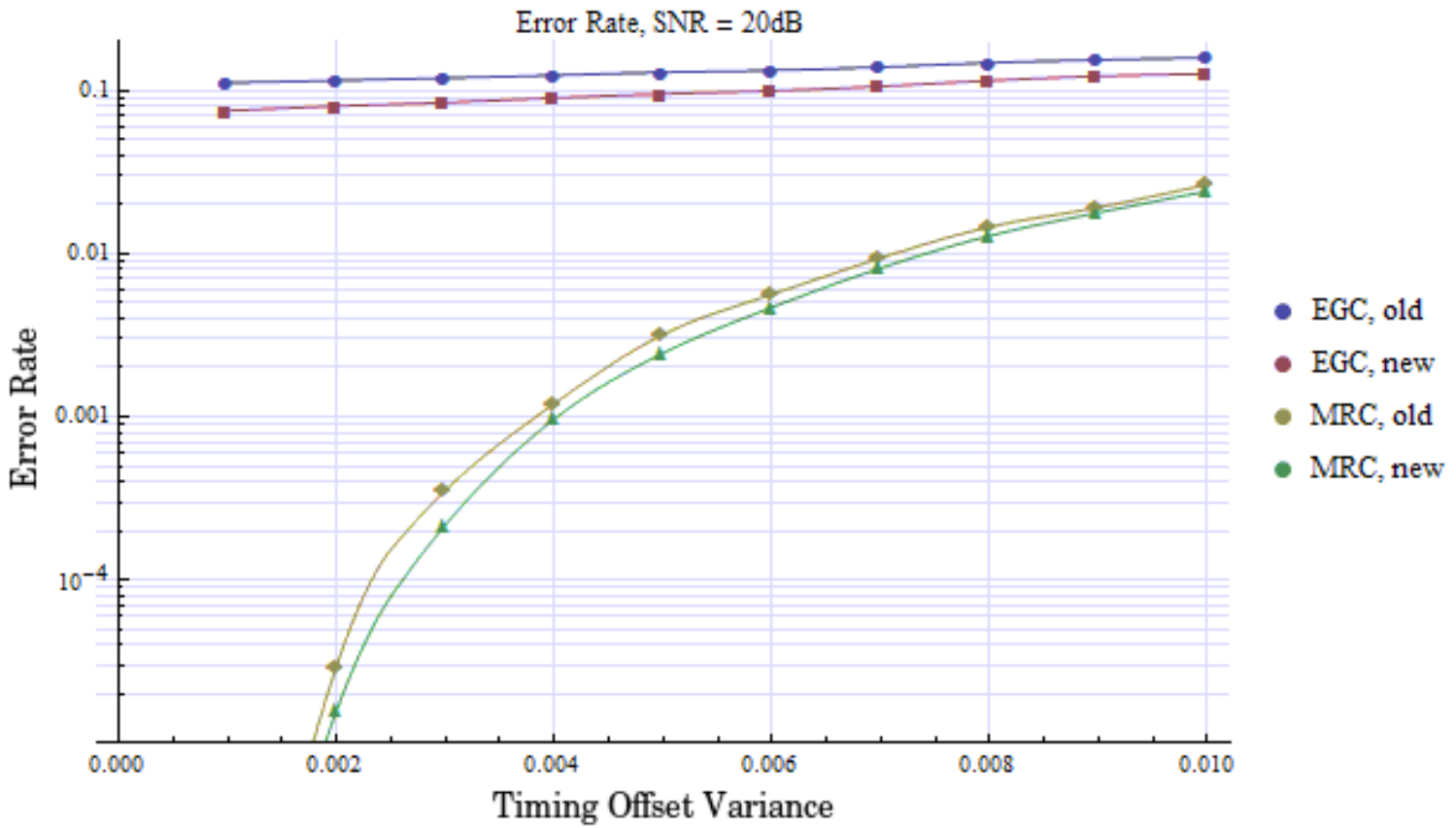
- Positive results:
  - Lower optimum decision region boundaries in the presence of timing error
  - Performance increase from redesigning detector to take this into account

RESULTS

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



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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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