

# Quantum Machine Learning

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# Quantum Error Correction

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## **Abstract**

The following content consists of the work done by me as a part of my Master's Thesis at Indian Institute of Science, Bengaluru. The work is done under the guidance of Prof. Phani Motamarri. This work includes notes made during the 1 year work from June 2024 to August 2025 and is based on the lectures, papers, books, and other resources that I have referred to during the course of my work. To a reader who is not at all familiar with Quantum Computing, this work will serve as a good starting point. I suggest starting with the Appendix to get a good grasp of the math used in the entire text. The work is divided into parts: The first part is the introduction to Quantum Computing, the second part is Quantum Linear Algebra, the third part is on Quantum Information Theory and at last the fourth part is on Quantum Error Correction. Along with the references, I have also included the code snippets that I have written during the course of my work. The references are included at the end of the document. I hope that this text helps the reader to get a good grasp on Quantum Computing. Enjoy reading!

## Acknowledgements

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# Contents

Acknowledgements	ii
1 Introduction	1
Bibliography	2

# Chapter 1

## Introduction

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# Bibliography

- [1] Daniel A Lidar and Todd A Brun. *Quantum error correction*. Cambridge university press, 2013.