

Quantum Harmonic Oscillator Ladder Operators

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Abstract

Algebraic solution of the QHO.

1 Introduction

This report presents computational analysis of harmonic oscillator.

2 Mathematical Framework



Figure 1: Primary analysis results.

3 Secondary Analysis

harmonic_oscillator_plot2.pdf

Figure 2: Secondary analysis comparison.

4 Parameter Study



Figure 3: Parameter sensitivity analysis.

5 2D Visualization



harmonic_oscillator_plot4.pdf

Figure 4: Two-dimensional field visualization.

6 Distribution Analysis



harmonic_oscillator_plot5.pdf

Figure 5: Statistical distribution analysis.

7 Time Series



Figure 6: Time series visualization.

8 Results Summary

9 Conclusions

This analysis demonstrates the computational approach to harmonic oscillator.