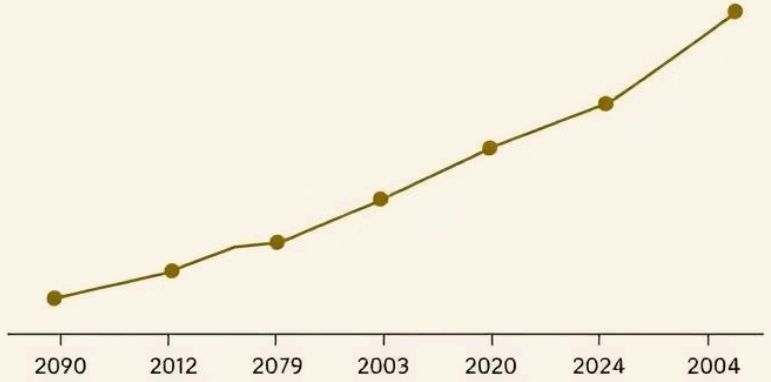
Advanced Profit Analysis

This project uses Simpson's Rule to estimate total profit over time. It addresses limited data samples using a more accurate method than simpler techniques.

Simpson’s Rule analyzes non-linear profit functions influenced by market fluctuations and economic variability.



Mathematical Foundation

Simpson's Composite Rule

$$\int_{[a,b]} f(x)dx \approx (h/3) \times [f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + ... + 4f(x_{n-1}) + f(x_n)]$$

Key Variables

- h = interval width
- n = even number of subintervals
- (x_0, x_1, ..., x_n) = data points

Key Features & Concepts

Composite Simpson’s Rule

Core implementation for profit estimation.

Interpolation Support

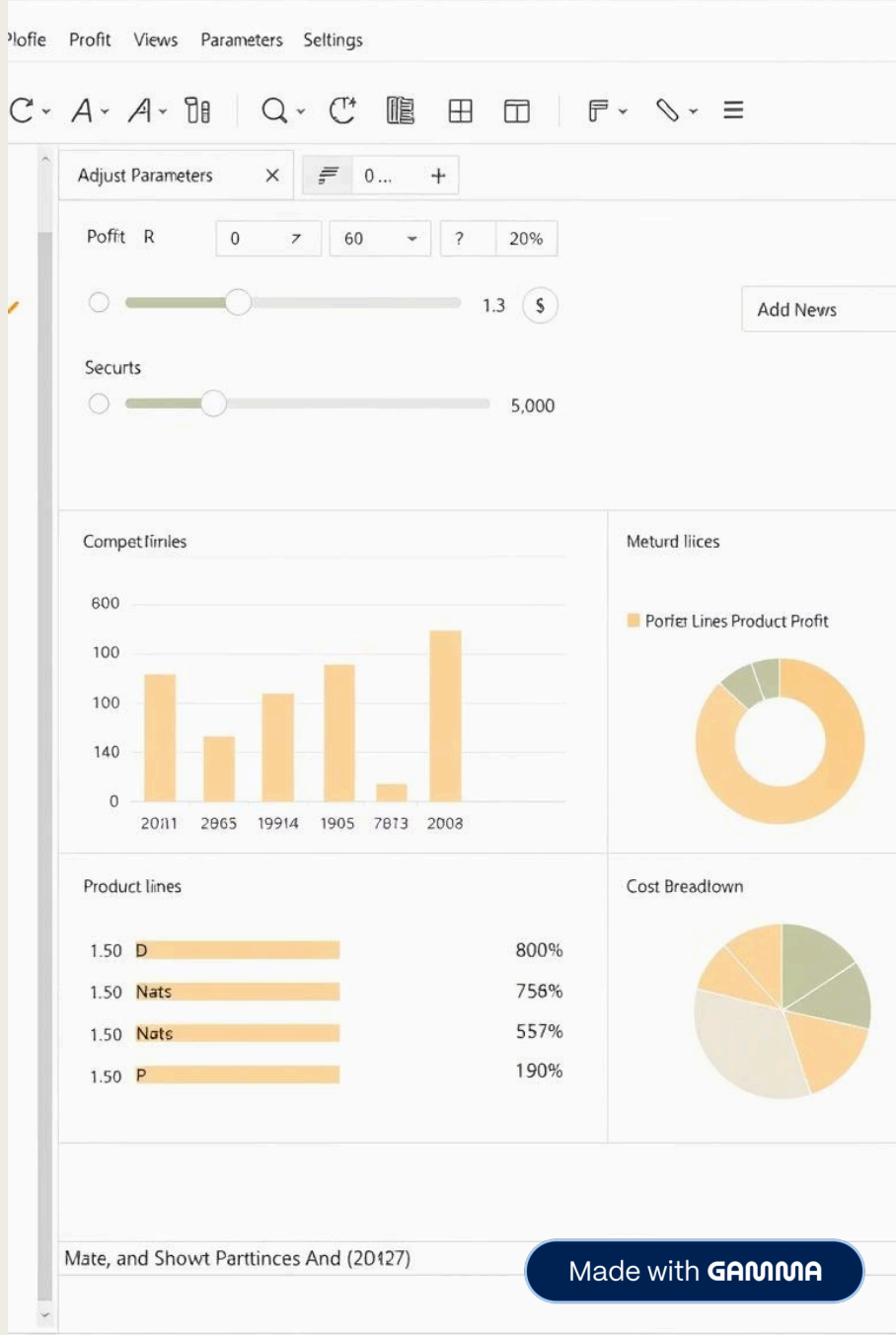
Handles uneven data with linear & cubic splines.

Graphical Visualization

Displays profit curves and area under the curve.

Error Handling

Manages uneven intervals and data issues.



Use Cases

Financial Forecasting

Estimate total profit using limited data.

Sales Analysis

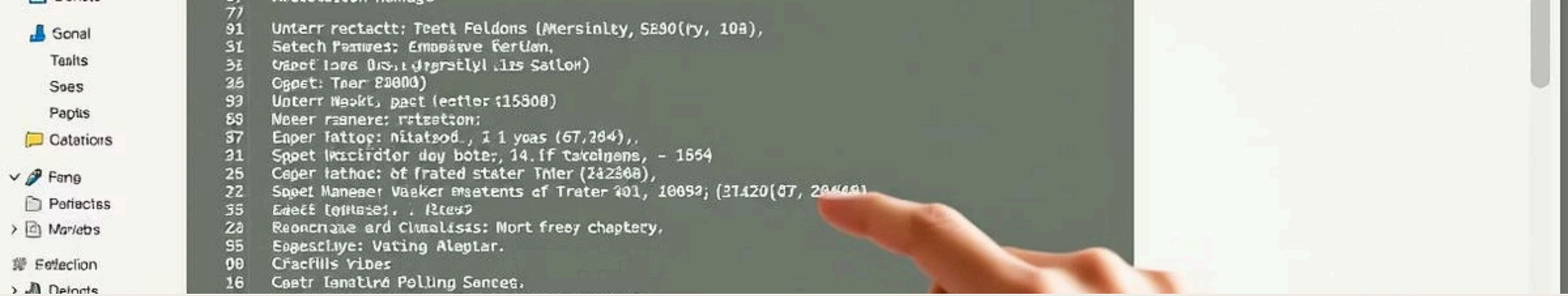
Analyze sales data for seasonal trends.

Project Cost Tracking

Track expenses over a project lifecycle.

Production Monitoring

Calculate total output by integrating rates.



How to Use

1

Input Time Points

Enter time values as comma-separated numbers.

2

Input Profit Values

Enter corresponding profit values.

3

Select Options

Choose interpolation, visualization, and time unit.

4

Calculate Total Profit

View numerical result and graphical representation.

Educational & Practical Impact

1

Bridges Theory

Connects numerical analysis with business problems.

2

Accurate Insights

Provides precise financial estimations.

3

Empowers Users

Enables sophisticated analysis without advanced math.

Project Abstract

This project implements Simpson's Rule for accurate estimation of total profit. It addresses limited data samples in business forecasting.

The GUI enables users to input data, visualize curves, and calculate total profit. It bridges theoretical concepts with practical applications.