Sophos Alpha Research

Quantitative Finance Education & Research

Table of contents

Educational resources for understanding quantitative finance — from foundational concepts to advanced trading strategies.

1 Explore Topics

1.1 Fundamentals

Returns, volatility, Sharpe ratio, drawdowns, and correlation — the building blocks of quantitative analysis.

1.2 Portfolio Theory

Mean-variance optimization, efficient frontiers, and modern portfolio construction techniques.

1.3 Derivatives

Option pricing with Black-Scholes, the Greeks, and practical interpretations for trading.

1.4 Time Series

Stationarity, unit roots, GARCH models, and volatility forecasting methods.

1.5 Risk Management

Value at Risk, Expected Shortfall, and quantitative approaches to measuring portfolio risk.

1.6 Strategies

Momentum, mean reversion, and systematic trading strategies with backtesting frameworks.

1.7 Systematic

Volatility control, trend following, and systematic trading approaches.

2 What We Cover

Each article includes:

- **Mathematical foundations** — Derivations and formulas with LaTeX
- **Python implementations** — Reproducible code and interactive charts
- **Practical interpretations** — How to apply concepts in real trading

---

Browse all articles →