README.md — Quantor-MTFuzz / SPYOptionTrader

Documentation Package

Overview

This ZIP archive contains the complete architectural, mathematical, and implementation documentation for the **Quantor-MTFuzz Decision Engine**, as integrated into the **SPYOptionTrader** system. The materials collectively describe how market data is transformed into constrained, auditable trading decisions, with a particular focus on multi-timeframe analysis and options strategies such as Iron Condors.

The documentation is designed to support:

- Developers implementing or extending the system
- Reviewers validating mathematical correctness
- Auditors assessing decision traceability
- Strategists evaluating robustness and design intent

Directory Contents

The ZIP contains the following reports and diagrams:

- Structural Integration and Optimization of the Quantor-MTFuzz Decision Engine
- SPYOptionTrader – Mathematical & Logical Decision Framework
- Consolidated Equation List for Quantor-MTFuzz
- SPYOptionTrader – Codex Cross Reference of All Functions
- Code–Framework Cross Reference Diagram
- Structural Integration Diagrams
- Appendix E Diagrams
- Current Software Test Status Report

Recommended Reading Order

1. **Structural Integration and Optimization**
   Establishes system architecture, module boundaries, and execution flow.
2. **Mathematical & Logical Decision Framework**
   Defines all variables, constraints, probabilities, and decision logic.
3. **Consolidated Equation List**
   Reference companion containing all equations used across the system.

4. **Codex Cross Reference of All Functions**
   Maps equations and decision logic directly to software functions.
5. **Code–Framework Cross Reference Diagram**
   Visual representation of logic-to-code relationships.
6. **Structural Integration Diagrams**
   Detailed subsystem and dataflow diagrams.
7. **Appendix E Diagrams**
   Supplemental visuals for edge cases and alternate flows.
8. **Current Software Test Status**
   Implementation maturity, test coverage, and known gaps.

Intended Audience

- Quantitative developers
- Trading system architects
- Risk and compliance reviewers
- Technical auditors

Quantor-MTFuzz Decision Engine

Executive Summary

The **Quantor-MTFuzz Decision Engine** is a deterministic, mathematically constrained trading decision system designed to evaluate and execute SPY options strategies under uncertainty. Its primary objective is to convert noisy, multi-timeframe market data into disciplined, auditable trade decisions while strictly enforcing risk, probability, and structural constraints.

Unlike heuristic or purely machine-learning-driven systems, Quantor-MTFuzz emphasizes **explicit mathematical logic**, **traceability**, and **structural integrity**. Every trade decision can be decomposed into defined equations, thresholds, and logical gates, allowing full post-hoc analysis and regulatory defensibility.

Core Capabilities

- **Multi-Timeframe Signal Fusion**
  Integrates signals across multiple temporal resolutions without allowing any single timeframe to dominate decisions.
- **Fuzzified Decision Logic**
  Converts continuous indicators into graded confidence states rather than binary triggers, improving stability under market noise.

- **Hard Risk and Probability Constraints**
  Trades are only permitted when all mathematical and logical bounds are satisfied.
- **Strategy-Aware Execution**
  Explicitly models Iron Condor and related options structures rather than treating options as generic instruments.

System Design Philosophy

The system is built around three guiding principles:

1. **Determinism over opacity** – every outcome is explainable.
2. **Structure before optimization** – architecture is fixed before tuning.
3. **Auditability by construction** – traceability is not an afterthought.

Documentation Scope

The accompanying documentation set provides:

- A formal mathematical specification of all decision logic
- A complete mapping from equations to code functions
- Visual diagrams of system structure and data flow
- A current snapshot of software test coverage and maturity

Together, these materials enable independent validation of correctness, risk posture, and implementation fidelity.

Intended Use

Quantor-MTFuzz is suitable for:

- Systematic SPY options trading
- Research environments requiring reproducibility
- Deployment contexts where explainability and control are mandatory

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