YIELDS

Making risk manageable

YIELDS

Introduction

Yields is the first model risk management platform for the financial industry

Core functionality

Yields automates the analysis of the quality of financial analytics using an extensive test bench. It has three main functions:

1. **Model validation**
2. **Model quality regression**
3. **Model risk monitoring**

Main applications include:

- Analyzing market data generation (curves and volatility surfaces)
- Automating pricer validation
- Prudent valuation

Characteristics

- Platform independent
- Readily integrated with several major trading solutions (Calypso, OpenGamma, Quantlib)
- Extensible to any other analytics library through the standardized interface
- Integrated with continuous integration servers

Your benefits

- Provides quickstart to advanced model risk management
- Assures faster and more complete testing of financial analytics
- Shortens timelines of upgrade and greenfield projects
- Catalyzes model quality and stability, leading to better risk management and more stable models

1. Model validation

How?   Yields tests mathematical models much like an experienced model validation team

- The platform contains a rich set of properties that financial models should satisfy. Properties include stability criteria, arbitrage relationships, performance, etc.

- Yields then generates millions of scenario's to analyze the model dynamics under various market conditions

- Yields then verifies the selected attributes to express model quality in a set of key performance indicators and summarizes the result in a single score.

For who?   Business analyst in a greenfield or upgrade project

- Reducing the time required to test new functionality

- Perfect reproducibility of issues – Yields also allows to save test cases into the target system

- Interactive testing of analytics

- Continuously monitoring improvements when hotfixes/updates arrive

- Thanks to the large degree of automation, Yields leads to a large increase in efficiency, thereby reducing project timelines and FTE budget typically valuing 100-200k USD.

Back to selection   Swaption Volatility Arbitrage Test Summary   **Y**IELDS

OG_validation_swaptions / 2015/04/07 22:08:20 / Swaption Volatility Arbitrage

Berestycki_SABR_expansion

arbitrage	0.9655
expansion accuracy	0.985
Score	**0.9753**

winner

	putCallParity	positiveProbabilityPuts	volatility	butterflyPremium	positiveProbabilityCalls
Error	0	0	0	0	0
Failed	0	0	7	70	36
Succeeded	992	992	985	922	956
Total	992	992	992	992	992

Hagan_SABR_expansion

arbitrage	0.964
expansion accuracy	0.985
Score	0.9745

	putCallParity	positiveProbabilityPuts	volatility	butterflyPremium	positiveProbabilityCalls
Error	0	0	0	0	0
Failed	0	0	7	78	34
Succeeded	992	992	985	914	958
Total	992	992	992	992	992

Paulot_SABR_expansion

arbitrage	0.94125
expansion accuracy	0.964
Score	0.9526

	putCallParity	positiveProbabilityPuts	volatility	butterflyPremium	positiveProbabilityCalls
Error	0	0	0	0	0
Failed	0	0	4	86	21
Succeeded	968	968	964	882	947
Total	968	968	968	968	968

Johnson_SABR_expansion

arbitrage	0.92425
expansion accuracy	0.927
Score	0.9256

	putCallParity	positiveProbabilityPuts	volatility	butterflyPremium	positiveProbabilityCalls
Error	0	0	0	0	0
Failed	0	0	0	2	9
Succeeded	927	927	927	925	918
Total	927	927	927	927	927

2. Model quality regression

How? Yields approaches mathematical regression testing much like a large skilled quant team

1. During model construction, it allows the quants to test against the specifications of the models

2. These specifications are transformed into properties which are then tested, leading to various KPI's and an overall score

3. The score allows for monitoring the evolution of model improvements via CI server plugin

For who? Quant / risk manager

- Yields analyses the behavior of a mathematical model under various market regimes to anticipate model break-down

- Greatly reduces time to market for the introduction of new models

- Yields acts as a catalyst for model quality and stability which ultimately leads to better risk management and more stable models (hence lower VaR).

- As removing sparse instabilities has a large impact on VaR, the corresponding capital reductions are typically substantial (10-25%)
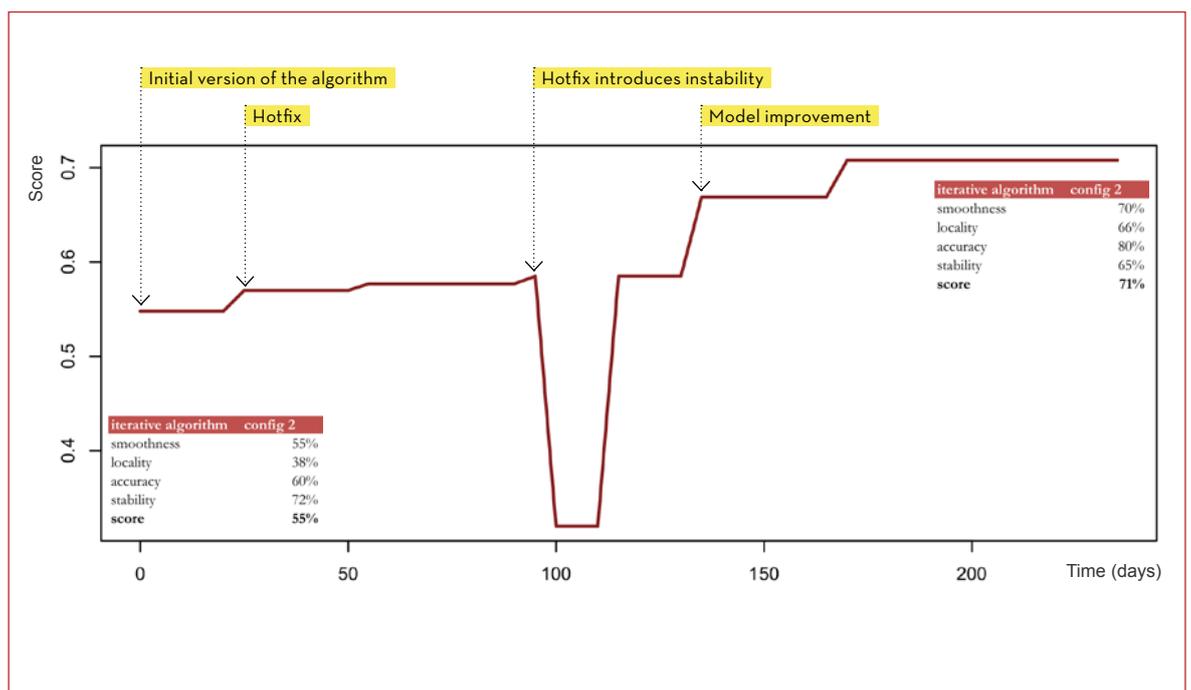
3. Model risk monitoring

How? Yields monitors mathematical models much like an experienced trader

1. Checks the quality of valuation and risks across the full trade portfolio at any time during the day

2. Looks in the neighborhood of the current market conditions to anticipate model breakdown

3. Identifies arbitrage opportunities

4. Creates transparency by visually representing model risk

For who? Trader

- Detects model problems across the trade population (e.g. risk instability, model inconsistency, arbitrage, reduced precision)

- Anticipates model break down due to unforeseen market conditions

- Leading to improved risk management and more informed risk taking.

- Since client trade margin is often expressed proportional to the market risk, the margin is quickly lost in case the market risk is inaccurate (margin might be too small) or unstable (margin is lost by paying bid-offers during frequent hedge rebalancing).

Trade id's where the numerical valuation brakes down with current market conditions.

Trades where the implied volatility smile allows for arbitrage opportunities. The valuation of these trades is therefore highly uncertain. The trader should use alternative models to better understand the actual NPV before unwinding these trades.

The red bar length is proportional to the amount of butterfly spread arbitrage.

Prudent valuation

How? The Yields platform calculates various AVA's (additional valuation adjustments) as required by the regulatory technical standards on prudent valuation of the CRR (capital requirements regulation).

Since many tests vary both the market data inputs, the model parameters or even the actual models, Yields can be used to calculate the confidence intervals needed for e.g.

- Market Price Uncertainty AVA

- Close-out Costs AVA

- Model Risk AVA

Yields may also be used to generate the necessary documentation needed to support the calculation.

Yields nv
Krom Genthof 6/15
8000 Bruges – Belgium

Yields nv
Krom Genthof 6/15
8000 Bruges – Belgium