
The UnRisk PRICING ENGINE for *Mathematica* Release Notes Version 4.0 (October 2009)

1. Introduction

This document gives an overview of the changes in the UnRisk PRICING ENGINE for Mathematica from Version 3.1 to Version 4.0

See the following sections for a detailed overview.

For installing the software (new installation or update from an older version), follow the steps in the installation instructions.

2. Parallelization within Excel

2.1. Excel Add-In: UnRisk Link for Excel

In Version 4.0 of the UnRisk PRICING ENGINE we introduce the UnRisk Link for Excel. By the use of this Excel Add-In a user who has installed *Mathematica 7* can perform valuations in parallel within Excel.

3. Expected Coupon Rates

3.1. Expected Coupon Rates of General CM Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of general constant maturity floater under the following interest rate models: General Hull & White model, Black Karasinski model, Hull & White 2 factor model and LIBOR market model.

3.2. Expected Coupon Rates of General Steepener

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of general steepener under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

3.3. Expected Coupon Rates of Snowball Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of snowball floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

3.4. Expected Coupon Rates of Ratchet Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of ratchet floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

3.5. Expected Coupon Rates of General Steepener Type 2

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of general steepener type 2 (with or without lock-in feature) under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

3.6. Expected Coupon Rates of General CM Floater Type 2

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of general constant maturity floater type 2 under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

3.7. Expected Coupon Rates of Quantos

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of quantos under two General Hull & White models.

3.8. Expected Coupon Rates of Quanto Spreads

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of quanto spreads under two General Hull & White models.

3.9. Expected Coupon Rates of Max / Min Volatility Bonds

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of max / min volatility bonds under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

3.10. Expected Coupon Rates of Volatility Bonds

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of volatility bonds under the following interest rate models: General Hull & White model and Black Karasinski model.

3.11. Expected Coupon Rates of Digital Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of digital range accruals under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

3.12. Expected Coupon Rates of Digital Spread Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of digital spread range accruals under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

3.13. Expected Coupon Rates of Spread Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of spread range accruals under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

3.14. Expected Coupon Rates of Dual Digital Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of digital spread range accruals under a LIBOR market model.

3.15. Expected Coupon Rates of Snowball Steepener

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of expected coupon rates of snowball steepener under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

4. Swap Valuation under LIBOR Market Models

4.1. Callable / Putable General CM Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable general constant maturity swaps under a LIBOR market model.

4.2. Callable / Putable General Amortizing CM Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable general amortizing constant maturity swaps under a LIBOR market model.

4.3. Callable / Putable Snowball Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable snowball swaps under a LIBOR market model.

4.4. Callable / Putable Ratchet Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable ratchet swaps under a LIBOR market model.

4.5. Callable / Putable Steepener Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable steepener swaps under a LIBOR market model.

4.6. Callable / Putable Steepener Type 2 Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / putable steepener type 2 swaps under a LIBOR market model.

4.7. Callable / Puttable Digital Range Accrual Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of callable / puttable digital range accrual swaps under a LIBOR market model.

4.8. Target Redemption Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of target redemption swaps under a LIBOR market model.

4.9. Target Redemption Steepener Swaps under LMM

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of target redemption steepener swaps under a LIBOR market model.

5. Survival Probabilities

5.1. Survival Probabilities of Callable / Putable General CM Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable general constant maturity floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.2. Survival Probabilities of Callable / Putable General Steepener

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable general steepener under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.3. Survival Probabilities of Callable / Putable Snowball Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable snowball floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.4. Survival Probabilities of Callable / Putable Ratchet Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable ratchet floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.5. Survival Probabilities of Callable / Putable Steepener Type 2

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable steepener type 2 (with and without lock-in feature) under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.6. Survival Probabilities of Callable / Putable General CM Floater Type 2

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable general constant maturity floater type 2 under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.7. Survival Probabilities of Callable / Putable Quantos

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable quantos under two General Hull & White models.

5.8. Survival Probabilities of Callable / Putable Quanto Spreads

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable quanto spreads under two General Hull & White models.

5.9. Survival Probabilities of Callable / Putable Snowball Steepener

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable snowball steepener under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.10. Survival Probabilities of Callable / Putable Digital Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable digital range accruals under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.11. Survival Probabilities of Callable / Putable Digital Spread Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable digital spread range accruals under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.12. Survival Probabilities of Callable / Putable Dual Digital Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable dual digital range accruals under a LIBOR market model.

5.13. Survival Probabilities of Callable / Putable Fixed Rate Bonds

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable fixed rate bonds under a LIBOR market model.

5.14. Survival Probabilities of Callable / Putable Spread Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable spread range accruals under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.15. Survival Probabilities of Callable / Putable Volatility Bonds

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable volatility bonds under the following interest rate models: General Hull & White model and Black Karasinski model.

5.16. Survival Probabilities of Target Redemption Digital Range Accruals

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption digital range accruals under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.17. Survival Probabilities of Target Redemption Notes

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption notes under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.18. Survival Probabilities of Target Redemption Quantos

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption quantos under two General Hull & White models.

5.19. Survival Probabilities of Target Redemption Snowball Floater

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption snowball floater under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.20. Survival Probabilities of Target Redemption Steepener

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption steepener under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.21. Survival Probabilities of Callable / Putable Digital Range Accrual Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable digital range accrual swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.22. Survival Probabilities of Callable / Putable General CM Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable general constant maturity swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.23. Survival Probabilities of Callable / Putable General Amortizing CM Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable general amortizing constant maturity swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.24. Survival Probabilities of Callable / Putable Steepener Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable steepener swaps under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.25. Survival Probabilities of Callable / Putable Steepener Type 2 Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable steepener type 2 swaps under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

5.26. Survival Probabilities of Callable / Putable Quanto Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable quanto swaps under two General Hull & White models.

5.27. Survival Probabilities of Callable / Putable Snowball Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable snowball swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.28. Survival Probabilities of Callable / Putable Ratchet Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of callable / putable ratchet swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.29. Survival Probabilities of Target Redemption Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption swaps under the following interest rate models: General Hull & White model, Black Karasinski model and LIBOR market model.

5.30. Survival Probabilities of Target Redemption Swaps

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calculation of survival probabilities of target redemption steepener swaps under the following interest rate models: Hull & White 2 factor model and LIBOR market model.

6. Heston Model

6.1. Calibration of a Heston model from volatility matrix

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the calibration of a Heston model from a given (strike and time-to-expiry dependent) volatility matrix.

6.2. Valuation of Vanilla Equity Options under a Heston model

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of European vanilla equity options under a Heston model.

6.3. Valuation of Equity Barrier Options under a Heston model

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of European equity barrier options under a Heston model.

6.4. Valuation of Equity Double Barrier Options under a Heston model

In version 4.0 of the UnRisk PRICING ENGINE we introduce functions for the valuation of European equity double barrier options under a Heston model.

7. HTML Based Documentation

7.1. New format of *Mathematica* On-line Documentation

In version 4.0 of the UnRisk PRICING ENGINE we adapt our documentation to format the *Mathematica* Documentation Center. The UnRisk documentation is no longer compatible with *Mathematica* 5.2 or earlier.

7.2. UnRisk Documentation Available on UnRisk Homepage

The documentation of version 4.0 of the UnRisk PRICING ENGINE will be also available on the new UnRisk homepage.