

# Rmetrics – Fact Sheet



## An Environment for Teaching Financial Engineering and Computational Finance with R Rmetrics Built 221.10065

Rmetrics is the premier open source solution for financial market analysis and valuation of financial instruments. With hundreds of functions build on modern and powerful methods Rmetrics combines explorative data analysis and statistical modeling with object oriented rapid prototyping. Rmetrics is a unique platform ideally suited for teaching financial engineering and computational finance.

## R Packages:

### 1 fBasics

#### 1.1 Economic and Financial Markets:

11A Market Statistics

#### 1.2 Financial Time Series Data:

12A Time Series Import

12B Plot Functions

12C fBasics Data

12D Zivot-Wang Data

#### 1.3 Distribution Functions in Finance:

13A Stable Distribution

13B Hyperbolic Distribution

13C Smoothed Spline Distribution

13D Distribution Fits

#### 1.4 Stylized Facts of Financial Series:

14A Stylized Facts

#### 1.5 Probability & Hypothesis Testing:

15A Basic Statistics

15B Portable Innovations

15C Hypothesis Testing

15D One Sample Tests

15E Two Sample Tests

### 2 fCalendar

#### 2.1 Date and Time Conventions:

21A ISO8601 Standard

#### 2.2 Posix Based R Implementation:

22A Posix Standard

#### 2.3 Rmetrics 'timeDate' Class:

23A Time Data Class

23B Daylight Saving Time

#### 2.4 Rmetrics 'timeSeries' Class:

24A Time Series Class

#### 2.5 Calendrical Calculations:

25A Calendar Data

25B Holiday Calendars

25C Holiday Dates

#### 2.6 High Frequency Data:

High Frequency Data Tools

### 3 fSeries

#### 3.1 Stationary Time Series:

31A ARMA Modelling

#### 3.2 Time Series with Trends:

32A Unitroot Distribution

32B Unitroot Tests

#### 3.3 Long Range Dependent Time Series:

33A Long Range Dependence

#### 3.4 Heteroskedastic Time Series:

34A GARCH Distributions

34B Heaviside Function

34C GARCH Modeling

34D GARCH Ox Interface

#### 3.5 Nonlinear and Chaotic Series:

35A Chaotic Time Series

35B Time Series Tests

#### 3.6 Data Sets:

36A fSeries Data

36B Mills Data

36C Tsay Data

### 4 fMultivar

A1 Bivariate Tools

A2 Multivariate Distributions

B1 Regression Modelling

B2 Regression Tests

B3 Equations Modelling  
B4 Equations Tests

*State Space Modeling  
VARMA and mGARCH*

C1 Vector Matrix Addon  
C2 Missing Values

D1 Technical Analysis  
D2 Benchmark Analysis

## 5 fExtremes

51A Extremes Data  
52A GEV Modelling  
53A GPD Modelling  
53B GPD Fit  
53C POT Fit  
54A Extremes GLM  
54B GPD GLM Fit  
54C PP Fit  
54D Rlarg Fit  
55A Extreme Index  
55A Extremes Builtin

## 6 fCopulae

**Bivariate Copulae**  
A1 Copulae Class  
A2 Elliptical Copulae  
A3 Archimedean Copulae  
A4 Extreme Value Copulae  
  
**Multivariate Copulae**  
B1 Multivariate Copulae

## 7 fTickdata

## 8 fOptions

**7.1 The Basics of Option Pricing:**  
A1 Plain Vanilla Options  
A2 Basic American Options  
A3 Binomial Tree Options

**7.2 Pricing Formulas for Exotic Options:**  
B1 Multiple Exercises Options  
B2 Multiple Assets Options  
B3 Lookback Options  
B4 Barrier Options  
B5 Binary Options  
B6 Asian Options  
B7 Currency Translated Options

**7.3 Heston-Nandi Options:**  
C1 Heston-Nandi Garch Fit  
C2 Heston-Nandi Options

**7.4 Monte Carlo Simulations of Options:**  
D1 Low Discrepancy Sequences  
D2 Monte Carlo Options

**7.5 Exponential Brownian Motion:**  
E1 Exponential Brownian Motion  
E2 Gamma and Related Functions  
E3 Confluent Hypergeometric Functions  
E4 Bessel Functions  
E5 EBM Asian Options

## 9 fBonds

*Bond Arithmetic  
Yield Curve Modeling  
Interest Rate Options  
Replicated Portfolios*

## 10 fPortfolio

A1 Multivariate Distributions  
A2 Assets Modelling  
A3 Drawdown Statistics

B1 Value-at-Risk Measures  
B2 Markowitz Portfolio  
B3 Two Assets Portfolio

*CVaR and CDaR Portfolios  
Stock Picking and Portfolio Selection  
Portfolio Benchmarks*

## 11 fActuar

## 12 fAgents

## 13 fBrowser

*Browser GUI  
Menus*

Topics printed in italic grey are not yet available under Rmetrics 221.10065

This fact sheets gives an overview about Rmetrics and what is coming next. We recommend also the following contributed packages: dse, evd, mvtnorm, pastecs, strucchange, systemfit, urca, ...

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