Description

A collection and description of functions for teaching computational finance and financial engineering.

Details

Some of the Rmetrics packages have become so huge that it is for many Rmetrics programmers a problem to find out where to search for a desired function. So we started to split the biggest packages in smaller ones.

So far Rmetrics (<= R-2.5.1) has packaged functions according to a quite simple subject classification scheme. We have extended it a little bit, and now this scheme comes with the following topics:

A) DATA SETS AND UTILIY FUNCTIONS
B) CHRONOLOGICAL OBJECTS, FINANCIAL CENTERS AND TIME SERIES
C) ANALYSIS OF FINANCIAL RETURNS AND VOLATILITY
D) TECHNICAL ANALYSIS, DECISION MAKING AND PREDICTION
E) EXTREME VALUE THEORY, COPULAE AND RISK MANAGEMENT
F) VALUATION OF FINANCIAL INSTRUMENTS
G) ASSET MANAGEMENT, PORTFOLIO ANALYSIS AND OPTIMIZATION

We think, this scheme starting with R-2.6.0, will help programmers and developers to search faster around for functions in the Rmetrics packages.

Changes to previous Rmetrics Packages:

Concerning A)
We splitted the package fEcofin in two packages:
fEcofin now holds all economic and financial data sets, and
fUtilities now holds all kinds of utility functions and general tools which are needed for Rmetrics (most as internal functions).

Concerning B)
We splitted the package fCalendar now into three packages:
fCalendar now holds timeDate class, zone and DST information, and everything what has to do with Holidays and Holiday Calendars,
fSeries now holds everything about timeSeries class,
fImport now holds download functions for several web data bases, like Yahoo, Economagic, Federal Reserve, and others.

Concerning C)
fBasics still holds everything about financial returns, stable and hyperbolic distributions, distributional fits, stylized facts, and hypothesis tests. The content of the former fSeries package has
moved to four new packages
fArma holds linear and long range time series models, fractional ARMA and fractional Brownian
Nois/Motion, mainly wrapper functions allowing for timeSeries objects and providing easy to use,
fGarch deals with volatility modeling using ARCH, GARCH, APARCH and related heteroskedastic
models, also providing an interface to OXGarch (Windows only)
fNonlinear is thought mainly for nonlinearity models, chaos and nonlinearity tests, e.g. like
BDS,
fUnitRoots deals with time series trends and unit root testing, implementing MacKinnon’s pValues and interfacing Pfaff’s urca package.

Concerning D)
The previous fMultivar package has been splitted now into four packages:
fMultivar now contains bivariate and multivariate return distributions and tools like bivariate
binning and gridding, interpolation,
fTrading deals with technical analysis, benchmark analysis and rolling analysis,
fRegression holds convenient wrappers allowing for timeSeries objects to be modeled by regression methods for building trading systems, for decision making and prediction)

Concerning E)
Nothing has changed so far.
fExtremes deals with GEV and GPD modeling, the extremal index, and Risk estimation,
fCopulae has functions for bivariate (only) copulae including elliptical, archimedean, extreme
value, mixed, and empirical copulae, tail dependency estimators.

Concerning F)
The huge fOptions package has been splitted into three new packages:
fOptions holds the option basics, like Black-Scholes, Heston-Nandi, Binomial Trees, American
Option Approximations, low discrepancy sequences and Monte Carlo valuation of options,
fExoticOptions has pricing formulas for dozens of exotic European options
fAsianOptions is made for Exponential Brownian Motion for (exact) pricing formulas of Asian
Options including moment matching methods, Gram-Charlier Series Expansion, PDE pricing, Laplace
Inversion approach, Spectral Expansion approach, and symmetry relations.
Bonds has been started up currently with functions for yield curve modeling.

Concerning G)
The package fPortfolio has been splitted into new packages:
fAssets deals with many aspects of asset selection and asset analysis, including robust statistics,
custering, correlation analysis, lower partial moments, etc.
fPortfolio is made for design and optimization of portfolios using either the standard Markowitz
or the Conditional Value-at-Risk approach, included are functions for rolling efficient portfolios and
frontiers.
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