Package 'Jdmbs'

May 2, 2018

Type Package

Version 1.3

Title Monte Carlo Option Pricing Algorithms for Jump Diffusion Models with Correlational Companies

Description Black-Scholes model [Black (1973) <doi:10.1086/260062>] is important to calculate option prices in the stock market and a variety of improved models are studied. In this package, I propose methods in order to calculate both Black-Scholes model and Jump diffusion model [Kou (2002) <doi:10.1287/mnsc.48.8.1086.166>] by Monte Carlo methods. This package can be used for computational finance.

Date 2018-05-02

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Depends R (>= 3.2.3)

License GPL (>= 2)

Imports igraph, graphics, stats, utils, png

Suggests R.rsp

VignetteBuilder R.rsp

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

NeedsCompilation no

Repository CRAN

Date/Publication 2018-05-01 22:44:51 UTC

R topics documented:

data *correlation coefficients between all pair companies*

Description

A dataset containing a matrix of correlation coefficients between all pair companies. 6 row and 6 col.

Usage

```
data
```

Format

An object of class `data.frame` with 6 rows and 6 columns.

jdm_bs *A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model*

Description

A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model

Usage

```
jdm_bs(companies, simulation.length = 180, monte_carlo = 1000,
  start_price = start_price, mu = mu, sigma = sigma,
  event_times = event_times, jump = jump, K = K, color = color)
```

Arguments

`companies`	: an integer of a company number in order to simulate.
`simulation.length`	: an integer of a time duration of simulation.
`monte_carlo`	: an integer of an iteration number for monte carlo.
`start_price`	: a vector of company's initial stock prices.
`mu`	: a vector of drift parameters of geometric Brownian motion.
`sigma`	: a vector of volatility parameters of geometric Brownian motion.
`event_times`	: an integer of how many times jump in unit time.
`jump`	: a vector of jump parameter.
`K`	: a vector of option strike prices.
`color`	: a vector of colors in plot.

Value

option prices : a list of (call_price, put_price)

Examples

```
price <- jdm_bs(3 ,simulation.length=100,monte_carlo=80,
               c(1000,500,500), c(0.002, 0.015, 0.01),
               c(0.08,0.04,0.06), 3, c(0.1,0.1,0.1),
               c(1300,600,700), c("red","blue","green")
               )
```

`jdm_new_bs` *A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model with Correlation Companies*

Description

A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model with Correlation Companies

Usage

```
jdm_new_bs(companies_data, companies, simulation.length = 180,
  monte_carlo = 1000, start_price = start_price, mu = mu, sigma = sigma,
  event_times = event_times, jump = jump, K = K, color = color)
```

Arguments

`companies_data`	: a matrix of a correlation coefficient of companies
`companies`	: an integer of a company number in order to simulate.
`simulation.length`	: an integer of a time duration of simulation.
`monte_carlo`	: an integer of an iteration number for monte carlo.
`start_price`	: a vector of company's initial stock prices.
`mu`	: a vector of drift parameters of geometric Brownian motion.
`sigma`	: a vector of volatility parameters of geometric Brownian motion.
`event_times`	: an integer of how many times jump in unit time.
`jump`	: a vector of jump parameter.
`K`	: a vector of option strike prices.
`color`	: a vector of colors in plot.

Value

option prices : a list of (call_price, put_price)

Examples

```
price <- jdm_new_bs(matrix(c(0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9),nrow=3, ncol=3),
                    3, simulation.length=100,monte_carlo=80, c(1000,500,500),
                    c(0.002, 0.012, 0.005),c(0.05,0.05,0.06), 3,c(0.1,0.1,0.1),
                    c(1500,1000,700),c("red","blue","green")
                   )
```

`normal_bs` *A Normal Monte Carlo Option Pricing Algorithm*

Description

A Normal Monte Carlo Option Pricing Algorithm

Usage

```
normal_bs(companies, simulation.length = 180, monte_carlo = 1000,
  start_price = start_price, mu = mu, sigma = sigma, K = K,
  color = color)
```

Arguments

`companies`	: an integer of a company number in order to simulate.
`simulation.length`	: an integer of a time duration of simulation.
`monte_carlo`	: an integer of an iteration number for monte carlo.
`start_price`	: a vector of company's initial stock prices.
`mu`	: a vector of drift parameters of geometric Brownian motion.
`sigma`	: a vector of volatility parameters of geometric Brownian motion.
`K`	: a vector of option strike prices.
`color`	: a vector of colors in plot.

Value

option prices : a list of (call_price, put_price)

Examples

```
price <- normal_bs(1, simulation.length=50, monte_carlo=100,1000, 0.007, 0.03, 1500, "blue")
```

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