Package ‘Jdmbs’

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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.
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**data**

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.

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**jdm_bs**

A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model

**Description**

A Monte Carlo Option Pricing Algorithm for Jump Diffusion Model

**Usage**

```r
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**

```r
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")
)
```

---

**Description**

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

**Usage**

```r
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)
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=1001000, 0.007, 0.03, 1500, "blue")
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