Package 'portn'

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Type Package

Title Portfolio Analysis for Nature

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Description The functions are designed to find the efficient mean-variance frontier or
portfolio weights for static portfolio (called Markowitz portfolio) analysis in resource
economics or nature conservation. Using the nonlinear programming solver ('Rsolnp'),
this package deals with the quadratic minimization of the variance-covariances without
shorting (i.e., non-negative portfolio weights) studied in Ando and Mallory (2012)
<doi:10.1073/pnas.1114653109>. See the examples, testing versions, and more details from:
<https://github.com/ysd2004/portn>.

Depends R (>= 4.0.0), Rsolnp

License GPL (>= 2)

URL https://github.com/ysd2004/portn

Encoding UTF-8

RoxygenNote 7.2.3

NeedsCompilation no

Repository CRAN

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Contents

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plotef   *Plot the efficient frontier line*

Description

Plotting the efficient frontier line from Markowitz (static) portfolio analysis

Usage

```
plotef(mptres)
```

Arguments

mptres   a list from `staticmpt` function

Details

This function provides the efficient frontier (blue line) using the result from `staticmpt` function. An array of inefficient weights are presented with red line. The observed returns and standard deviations are black dots.

Value

A plot of the efficient frontier

References

Ando, A. W. and M. L. Mallory. (2012) Optimal Portfolio Design to Reduce Climate-related Conservation Uncertainty in the Prairie Pothole Region. Proceedings of the National Academy of Sciences (PNAS). 109 (17) pp. 6484-6489.

See Also

staticmpt

Examples

```
## No change likely scenario of CCI in Figure 2, Ando and Mallory (2012)
rs <- c(0.265,0.671,0.372)
vmat <- matrix(c(0.003,0.005,-0.006,0.005,0.013,-0.010,-0.006,-0.010,0.012),ncol=3)
mus <- seq(min(rs),max(rs),length.out=100)
cci <- staticmpt(mus,rs,vmat)
plotef(cci)
```

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staticmpt	*Static Portfolio Optimization*

Description

The function generates portfolio weights for nature or conservation

Usage

```
staticmpt(mus, rbar, vmat)
```

Arguments

mus	An array of the expected values
rbar	An array of the observed mean returns
vmat	A variance and covariance matrix

Details

This function solves the series of the standard Markowitz portfolio analysis for nature or conservation, i.e., the quadratic problem without shorting.

min w' vmat w
s.t. w rbar = mu
w' 1 = 1 where w >= 0

where w is an array of non-negative portfolio weights, rbar is an array of the observed mean returns, vmat a matrix of variance-covariance matrix, and mu is an expected value.

Value

A list including the following component:

rbar An array of the observed mean returns

vmat A variance and covariance matrix

efdata A data.frame including:
- sd standard deviation
- er expected return in mus
- conv convergence status in optimization (0 = successful, otherwise: not an interior solution)
- w1, w2, ... portfolio weights
- ef 1 = on the efficient frontier and 0 = not on the efficient frontier

References

Ando, A. W. and M. L. Mallory. (2012) "Optimal Portfolio Design to Reduce Climate-related Conservation Uncertainty in the Prairie Pothole Region." Proceedings of the National Academy of Sciences (PNAS). 109 (17) pp. 6484-6489.

See Also

plotef

Examples

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mus <- seq(min(rs),max(rs),length.out=100)
cci <- staticmpt(mus,rs,vmat)
```

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