

# Package ‘portn’

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**Type** Package

**Title** Portfolio Analysis for Nature

**Version** 1.0.0

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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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`plotef`*Plot the efficient frontier line*

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**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*


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## 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.

$$\begin{aligned} \min w' vmat w \\ \text{s.t. } w rbar = mu \\ w' 1 = 1 \text{ where } w \geq 0 \end{aligned}$$

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)
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