

Package ‘lppuw’

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Title Linear Program based Phase UnWrapping

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Requires Matrix, zernike, rcbc, R (>= 3.6.3)

Description Two algorithms for linear programming based phase unwrappers

Roxygen list(markdown = TRUE)

RoxygenNote 7.1.2

R topics documented:

brcutpuw 1

Index 3

brcutpuw	<i>Linear program based phase unwrapping</i>
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Description

brcutpuw implements a branch cut algorithm for phase unwrapping

Usage

```
brcutpuw(phase, pen = 0, details = FALSE, trace = 1)
```

```
netflowpuw(phase, wts = NULL, details = FALSE, trace = 1)
```

Arguments

phase	matrix with phase map to be unwrapped (phases are in radians)
pen	penalty for making a branch cut from a residue to an edge (brcutpuw only)
details	Return some details of the solution?
trace	Send some info from the LP solver to the console?
wts	matrix of weights for cost function with same dimension as phase (netflowpuw only)

Details

This package implements two distinct algorithms for two dimensional phase unwrapping that can be set up and solved as general linear programs. The linear programs are solved using the LP solver CBC from **COIN-OR** using the interface provided by the package **rcbc**.

Value

The unwrapped wavefront in units of fringes. If `details` is `TRUE` additional details of the solution are returned in a named list with the first member `puw` containing the unwrapped wavefront.

Functions

- `brcutpuw`: Branch cut algorithm for phase unwrapping
- `netflowpuw`: Network flow algorithm for phase unwrapping

Note

According to the documentation for `rcbc` different levels of detail from the LP solver can be printed with trace levels up to 15, however the same output seems to be returned for all values. Setting `trace=0` will produce silent output, which may not be advisable since these can take some time to run.

The value of `trace` doesn't matter when running in a Windows "GUI" console window or Rstudio because the CBC output isn't passed. If you want to see some output run in a terminal window instead.

See Also

There is a function with the same name `brcutpuw` in package [zernike](#).

Examples

```
data("phasemaps", package="lppuw")
mtext(zernike::rmap(phi, plot=TRUE))
wf.bc <- lppuw::brcutpuw(phi)
X11()
zernike::plot.pupil(wf.bc, col=zernike::rygcb(400))
mtext("Unwrapped wavefront from branch cut algorithm")
wf.nf <- netflowpuw(phi, mod)
X11()
zernike::plot.pupil(wf.nf, col=zernike::rygcb(400))
mtext("Unwrapped wavefront from network flow algorithm")
cat("Summary of the difference between the two unwrapped wavefronts:\n")
zernike::summary.pupil(wf.nf - wf.bc)
```

Index

brcutpuw, [1](#)

netflowpuw (brcutpuw), [1](#)

zernike, [2](#)