Package ‘mosqcontrol’

October 13, 2022

Type Package
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Version 0.1.0
Description This project aims to make an accessible model for mosquito control resource optimization. The model uses data provided by users to estimate the mosquito populations in the sampling area for the sampling time period, and the optimal time to apply a treatment or multiple treatments.
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R topics documented:

control .................................................. 2
mosqcontrol ............................................... 3
uperm .................................................... 3

Index 5
control  

Optimal Control

Description

Creates optimal schedule of pulses for mosquito control.

Usage

control(
    counts,  
    time,  
    mu = 1/14,  
    m = 3,  
    n_lam = 25,  
    kmax = 20,  
    global_opt = 0,  
    n_pulse = 4,  
    rho = 0.3,  
    days_between = 3,  
    max_eval = 10000
)

Arguments

counts  
    Numeric vector of population counts.

time  
    Numeric vector with corresponding day of year measurement. Example: Jan 1st = day 1. Must be same length as counts.

mu  
    Numeric indicating natural population death rate.

m  
    Numeric indicating number of lifetimes for population decay between seasons

n_lam  
    Numeric max fourier mode order to calculate.

kmax  
    Numeric max number of dynamics fourier modes to use in calculating fourier sum (different than N_lam = max emergence fourier mode set by user for curve fitting portion of the code. Kmax should be an integer between 2 and 200, default at 20.

global_opt  
    Numeric set to 0 if user chooses local optimum, 1 if user chooses global GN_DIRECT_L_RAND method, 2 if user chooses global GN_ISRES method.

n_pulse  
    Numeric number of pulses, set by user, integer between 1 and 10.

rho  
    Numeric percent knockdown (user set between .01 and .30, e.g. 1% to 30% knockdown).

days_between  
    Numeric minimum number of days allowed between pulses set by user (integer between 0 and 30 days).

max_eval  
    Numeric maximum evaluations for optimization step.
Value

Control list of control parameters.

Examples

```r
y_in <- c(15, 40, 45, 88, 99, 145, 111, 132, 177, 97, 94, 145, 123, 111,
125, 115, 155, 160, 143, 132, 126, 125, 105, 98, 87, 54, 55, 8
)
t_in_user <- c(93, 100, 107, 114, 121, 128, 135, 142, 149, 163, 170, 177,
184, 191, 198, 205, 212, 219, 226, 233, 240, 247, 254, 261,
267, 274, 281, 288
)
control(y_in, t_in_user, global_opt = -1)
```

Description

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Description

uperm returns permutation matrix.

Usage

uperm(d)
Arguments
d Vector

Details
For a given list of numbers, this function outputs a matrix, where each row is a unique permutation of the list.

Examples
uperm(c(1, 2))
Index

control, 2
mosqcontrol, 3
mosqcontrol-package (mosqcontrol), 3
uperm, 3