# Package 'vmd'

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**Type** Package

**Title** Variational Mode Decomposition

**Version** 0.1.0

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**Author** Nicholas Hamilton [aut, cre], Michael Ferry [aut]

**Maintainer** Nicholas Hamilton <n.hamilton@unsw.edu.au>

**Description** A port and extension to the original 'Matlab' code made public by Dragomiretskiy and Zosso, for conducting Variational Mode Decomposition (VMD) as described within their 2013 publication (publication: <doi:10.1109/TSP.2013.2288675>, source: <https://goo.gl/fJH1d5>).

**License** GPL-2

**Encoding** UTF-8

**LazyData** true

**Imports** Rcpp (>= 0.12.12), ggplot2 (>= 2.1), magrittr, reshape2, scales, R6

**RoxygenNote** 5.0.1

**NeedsCompilation** no

**Repository** CRAN

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## R topics documented:

## vmd-package *VMD Package*

### Description

Package for performing variational mode decomposition

### Author(s)

Nicholas Hamilton

## checker *R6 Class of Standard Checking Utilities*

### Description

Create a new R6 Class that contains public methods of standard checking utilities

### Usage

```
checker()
```

### Format

An object of class `R6ClassGenerator` of length 24.

## vmd *Create VMD Object*

### Description

Create instance of `R6Vmd`, which is an R6 implementation, ported from the original 2013 Matlab code developed by Dragomiretskiy & Zosso.

### Usage

```
vmd(signal, alpha = getOption("vmd.alpha"), tau = getOption("vmd.tau"),
  K = getOption("vmd.K"), DC = getOption("vmd.DC"),
  init = getOption("vmd.init"), tol = getOption("vmd.tol"), ...)
```

## Arguments

| | |
|---|---|
| signal | the time domain signal (1D) to be decomposed |
| alpha | the balancing parameter of the data-fidelity constraint |
| tau | time-step of the dual ascent (pick 0 for noise-slack) |
| K | the number of modes to be recovered |
| DC | true if the first mode is put and kept at DC (0-freq) |
| init | 0 = all omegas start at 0, 1 = all omegas start uniformly distributed or 2 = all omegas initialized randomly |
| tol | tolerance of convergence criterion, typically around 1e-6 |
| ... | any other arguments to be passed to the R6 initializer |

## Author(s)

Nicholas Hamilton, UNSW Sydney

## References

Variational Mode Decomposition, Dragomiretskiy & Zorro, 2013, http://dx.doi.org/10.1109/TSP.2013.2288675

Original Matlab Source: https://goo.gl/fJH1d5.

## Examples

```
x = seq(-2*pi,2*pi,length.out=1000)
signal = cos(x)
v = vmd(signal,DC=FALSE,tol=1e-3)
v$getResult()
plot(v)

nv   = 1000
fs   = 1/nv
t    = (1:nv)/nv
freq = 2*pi*(1 - 0.5 - 1/nv)/fs
f_1 = 2;
f_2 = 24;
f_3 = 288;
f_4 = 12;
v_1 = (cos(2*pi*f_1*t));
v_2 = 1/4*(cos(2*pi*f_2*t));
v_3 = 1/16*(cos(2*pi*f_3*t));
v_4 = 1/8*(cos(2*pi*f_4*t));
signal = v_1 + v_2 + v_3 + v_4 + 0.5*runif(nv,min=-0.5,max=0.5);
v = vmd(signal,alpha=2000,tau=0,DC=FALSE,init=0,tol=1e-3,K=3,orderModes=TRUE)

#List of Results
l = v$getResult()
names(l)

#To Data Frame
```

```
df = as.data.frame(v)
head(df)

#Plot Results
plot(v)
plot(v,facet='bymode',scales='free')
plot(v,facet='byclass',scales='free')

#Input Spectrum
v$plot.input.spectrum()

#Spectral Decomposition
v$plot.spectral.decomposition()
```

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