Description  This algorithm classifies the trends into linear, quadratic, cubic, concealed and no-trend types. The "concealed trends" are those trends that possess quadratic or cubic forms, but the net change from the start of the time period to the end of the time period hasn't been significant. The "no-trend" category includes simple linear trends with statistically in-significant slope coefficient.
### Site 1

**Description**

Example of a cubic trend (Site 1, Jamali et al. 2014)

**Usage**

```r
data("ex.a")
```

**Format**

The format is: `num [1:25] 0.477 0.526 0.52 0.571 0.554 ...`

**Source**


**Examples**

```r
data(ex.a)
# maybe str(ex.a) ; plot(ex.a) ...`
```

### Site 2

**Description**

Example of a cubic trend (Site 2, Jamali et al. 2014)

**Usage**

```r
data("ex.b")
```

**Format**

The format is: `num [1:25] 0.254 0.267 0.184 0.22 0.208 ...`

**Source**

Examples

data(ex.b)
## maybe str(ex.b) ; plot(ex.b) ...

Description

Example of a concealed trend with cubic form (Site 3, Jamali et al. 2014)

Usage

data("ex.c")

Format

The format is: num [1:25] 0.712 0.726 0.736 0.723 0.739 ...

Source


Examples

data(ex.c)
## maybe str(ex.c) ; plot(ex.c) ...

Description

Example of a concealed trend with cubic form (Site 4, Jamali et al. 2014)

Usage

data("ex.d")

Format

The format is: num [1:25] 0.6 0.54 0.447 0.478 0.457 ...
Source


Examples

```r
data(ex.d)
## maybe str(ex.d) ; plot(ex.d) ...
```

---

**Site 5**

Example of a quadratic trend (Site 5, Jamali et al. 2014)

Usage

```r
data("ex.e")
```

Format

The format is: num [1:25] 0.26 0.278 0.196 0.224 0.261 ...

Source


Examples

```r
data(ex.e)
## maybe str(ex.e) ; plot(ex.e) ...
```
### ex.f

**Site 6**

**Description**

Example of a quadratic trend (Site 6, Jamali et al. 2014)

**Usage**

```r
data("ex.f")
```

**Format**

The format is: num [1:25] 0.327 0.259 0.212 0.298 0.248 ...

**Source**


**Examples**

```r
data(ex.f)
## maybe str(ex.f) ; plot(ex.f) ...
```

### ex.g

**Site 7**

**Description**

Example of a concealed trend with quadratic form (Site 7, Jamali et al. 2014)

**Usage**

```r
data("ex.g")
```

**Format**

The format is: num [1:25] 0.147 0.153 0.104 0.123 0.15 ...

**Source**

### Site 8

**Description**

Example of a concealed trend with quadratic form (Site 8, Jamali et al. 2014)

**Usage**

```r
data("ex.h")
```

**Format**

The format is: num [1:25] 0.813 0.809 0.753 0.792 0.727 ...

**Source**


**Examples**

```r
data(ex.h)
## maybe str(ex.h) ; plot(ex.h) ...
```

---

### Site 9

**Description**

Example of a linear trend (Site 9, Jamali et al. 2014)

**Usage**

```r
data("ex.k")
```

**Format**

The format is: num [1:25] 0.382 0.373 0.228 0.385 0.271 ...

**Examples**

```r
data(ex.k)
## maybe str(ex.k) ; plot(ex.k) ...
```
Source


Examples

data(ex.k)
## maybe str(ex.k) ; plot(ex.k) ...

Description

Example of a linear trend (Site 10, Jamali et al. 2014)

Usage

data("ex.m")

Format

The format is: num [1:25] 0.781 0.738 0.795 0.871 0.736 ...

Source


Examples

data(ex.m)
## maybe str(ex.m) ; plot(ex.m) ...
**PolyTrend**

**Description**

Example of a no-trend (Site 11, Jamali et al. 2014)

**Usage**

```
data("ex.n")
```

**Format**

The format is: num [1:25] 0.567 0.625 0.61 0.589 0.569 ...

**Source**


**Examples**

```
data(ex.n)
## maybe str(ex.n) ; plot(ex.n) ...
```

---

**PolyTrend**

**Trend Classification Algorithm**

**Description**

PolyTrend classifies the trends into linear, quadratic, cubic, concealed and no-trend types. The "concealed trends" are those trends that possess quadratic or cubic forms, but the net change from the start of the time period to the end of the time period hasn’t been significant. The "no-trend" category includes simple linear trends with statistically in-significant slope coefficient.

**Usage**

```
PolyTrend(Y, alpha)
```

**Arguments**

- `Y` a vector of values corresponding to the trend or de-seasonalised component of vegetation time series data.
- `alpha` the statistical significance level.
Details

An object of the class "PT" is a list including the trend type, slope, direction, and statistical significance.

Value

TrendType: the trend type as a number, which can be -1, 0, 1, 2, or 3. The values correspond to a concealed trend (-1), no trend (0), linear trend (1), quadratic trend (2) or cubic trend (3).

Slope: the linear slope value.

Direction: the linear slope direction as a number, which can be 1 or -1. The values correspond to increasing (1) or decreasing direction (-1).

Significance: the slope significance as a number, which can be 1 or -1. The values correspond to statistically significant (1) or statistically in-significant (-1).

PolynomialDegree: the polynomial degree as a number, which can be 0, 1, 2, or 3. The values correspond to no-trend (0), linear (1), quadratic (2), or cubic (3).

Author(s)

Sadegh Jamali, Hristo Tomov

References


Examples

## Following examples are taken from Fig. 3 in Jamali et al. 2014
## Examples of a cubic trend (Site 1 & Site 2)
data(ex.a)
data(ex.b)

pt.a <- PolyTrend(ex.a, 0.05)
plot(pt.a, fig.dates = c(1982:2006))

pt.b <- PolyTrend(ex.b, 0.05)
plot(pt.b, fig.dates = c(1982:2006))

## Examples of a concealed trend with cubic form (Site 3 & Site 4)
data(ex.c)
data(ex.d)

pt.c <- PolyTrend(ex.c, 0.05)
plot(pt.c, fig.dates = c(1982:2006))

pt.d <- PolyTrend(ex.d, 0.05)
plot(pt.d, fig.dates = c(1982:2006))

## Examples of a quadratic trend (Site 5 & Site 6)
data(ex.e)
data(ex.f)

pt.e <- PolyTrend(ex.e, 0.05)
plot(pt.e, fig.dates = c(1982:2006))

pt.f <- PolyTrend(ex.f, 0.05)
plot(pt.f, fig.dates = c(1982:2006))

## Examples of a concealed trend with quadratic form (Site 7 & Site 8)
data(ex.g)
data(ex.h)

pt.g <- PolyTrend(ex.g, 0.05)
plot(pt.g, fig.dates = c(1982:2006))

pt.h <- PolyTrend(ex.h, 0.05)
plot(pt.h, fig.dates = c(1982:2006))

## Examples of a linear trend (Site 9 & Site 10)
data(ex.k)
data(ex.m)

pt.k <- PolyTrend(ex.k, 0.05)
plot(pt.k, fig.dates = c(1982:2006))

pt.m <- PolyTrend(ex.m, 0.05)
plot(pt.m, fig.dates = c(1982:2006))

## Example of a no-trend (Site 11)
data(ex.n)

pt.n <- PolyTrend(ex.n, 0.05)
plot(pt.n, fig.dates = c(1982:2006))
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