# Package 'apdesign'

October 12, 2022

**Title** An Implementation of the Additive Polynomial Design Matrix

**Version** 1.0.0

**Description** An implementation of the additive polynomial (AP) design matrix. It constructs and appends an AP design matrix to a data frame for use with longitudinal data subject to seasonality.

**Depends** R (>= 3.2.3)

**License** GPL-3

**LazyData** true

**Imports** Matrix (>= 1.2)

**RoxygenNote** 5.0.1

**Suggests** testthat

**NeedsCompilation** no

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**Repository** CRAN

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# R topics documented:

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apdesign                          *apdesign: AP coding* apdesign *returns a data frame with additive*
                                  *polynomial coding*

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### Description

apdesign: AP coding apdesign returns a data frame with additive polynomial coding

### Usage

```
apdesign(data, id_var, time_var, center_time, cycle_var, center_cycle,
  max_degree = c(1, 1))
```

### Arguments

| | |
|---|---|
| data | A data frame. |
| id_var | A character that indicates the subject identifier in data. |
| time_var | A character that indicates the within-cycle time indicator in data. |
| center_time | A numeric specifying the within-cycle time to center on. |
| cycle_var | A character that indicates the cycle indicator in data. |
| center_cycle | A numeric specifying the cycle to center on. |
| max_degree | A vector of numerics specifying the highest degree for each polynomial. |

### Value

Output will be a data frame.

### Examples

```
id <- c(rep(1,10), rep(2, 10))
y <- c(c(10, 15, 21, 20, 23, 25, 27, 25, 28, 29),
     c(12, 16, 18, 20, 20, 22, 28, 27, 29, 31))
time <- c(c(0.2, 0.5, 0.7), c(0.3, 0.6, 0.75, 0.89), c(0.1, 0.3, 0.8),
       c(0.3, 0.6, 0.7, 0.85), c(0.2, 0.7, 0.79), c(0.2, 0.5, 0.75))
cycle <- c(rep(1, 3), rep(2, 4), rep(3, 3), rep(1, 4), rep(2, 3), rep(3, 3))
df <- data.frame(id, y, time, cycle)
apdesign(data = df, id = "id", time_var = "time", cycle_var = "cycle",
        center_cycle = 1, center_time = 0, max_degree = c(2,1))
```

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| apdesign_i | *apdesign_i: AP coding for a single subject* |
|---|---|

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### Description

apdesign_i: AP coding for a single subject

### Usage

```
apdesign_i(data, cycle_var, center_cycle, time_var, center_time,
  max_degree = c(1, 1), matricies = FALSE)
```

### Arguments

| | |
|---|---|
| data | A data frame. |
| cycle_var | A character that indicates the cycle indicator in data. |
| center_cycle | A numeric specifying the cycle to center on. |
| time_var | A character that indicates the within-cycle time indicator in data. |
| center_time | A numeric specifying the within-cycle time to center on. |
| max_degree | A vector of numerics specifying the highest degree for each polynomial. |
| matricies | If TRUE, will print the AP, D1 and D2 matricies. |

### Value

Output will be a matrix.

### Examples

```
y <- c(10, 15, 21, 20, 23, 25, 27, 25, 28, 29)
time <- c(c(0.2, 0.5, 0.7), c(0.3, 0.6, 0.75, 0.89), c(0.1, 0.3, 0.8))
cycle <- c(rep(1, 3), rep(2, 4), rep(3, 3))
df <- data.frame(y, time, cycle)
apdesign_i(data = df, time_var = "time", cycle_var = "cycle",
         center_cycle = 1, center_time = 0, max_degree = c(2,1))
```

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indv_change                    *Repeated measures data over three years*

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#### Description

A dataset of longitudinal responses of 36 study participants over a three years span.

#### Usage

```
indv_change
```

#### Format

A data frame with 234 observations and 5 variables:

**id**  subject identifier

**cycle**  cycle number

**cycle_time**  time since the start of the cycle, in weeks

**start_time**  time since the start of the study, in weeks

**response**  outcome measure

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mean_change                    *Data for a single time trend over three years*

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#### Description

A dataset of mean responses of study participants over a three years span.

#### Usage

```
mean_change
```

#### Format

A data frame with 9 observations and 4 variables:

**cycle**  cycle number

**cycle_time**  time since the start of the cycle, in weeks

**start_time**  time since the start of the study, in weeks

**response**  outcome measure

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