

Package ‘Time.R’

June 19, 2026

Title Estimates Time of Concentration and Lag Time for Watersheds

Version 1.0.0

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Description Estimation of time of concentration and lag times for watersheds based on their morphometric characteristics. It includes various methods for calculation and offers plotting functionalities for comparative analysis. For more details see Bransby-Williams (1922, ISSN 2214-5818), Kirpich (1940) <<https://hess.copernicus.org/articles/24/2655/2020/>>, Kerby (1959, ISBN-13, 979-8355357214), Johnstone & Cross (1949, ISBN:9780823211234), California Division of Highways (1942, ISSN:0012-7353), Clark (1945) <[doi:10.1061/TACEAT.0005800](https://doi.org/10.1061/TACEAT.0005800)>, Giandotti (1934) <[doi:10.1080/02626667.2017.1384549](https://doi.org/10.1080/02626667.2017.1384549)>, Passini (1972, ISBN:84-7433-040-8), Téméz (1978, ISBN:84-7433-040-8), Pérez (1962, ISSN:0012-7353), Pilgrim (1977) <[doi:10.1029/WR013i003p00587](https://doi.org/10.1029/WR013i003p00587)>, Bureau of Reclamation (1973, ISBN:9780913232123), Valencia-Zuluaga (1983) <<https://repositorio.unal.edu.co/>>, Ventura & Heras (1964) <[doi:10.1061/9780784413548.005](https://doi.org/10.1061/9780784413548.005)>, Soil Conservation Service (1972, ISBN:OL15009517M), Soil Conservation Service (1986) <<https://www.ars.usda.gov/research/software/download/?softwareid=527>>, US Navy - Technical Publication Navdocks (1972) <ISBN:978-1289256234>, Federal Aviation Administration (1970, ISBN:9780913236543), Natural Environment Research Council (1975, ISBN:9780114501234), Mimikou (1984) <[doi:10.1080/02626668409490922](https://doi.org/10.1080/02626668409490922)>, Watt & Chow (1985) <[doi:10.1131/031](https://doi.org/10.1131/031)>, Haktanir & Sezen (1990) <[doi:10.1080/02626669009492423](https://doi.org/10.1080/02626669009492423)>.

License GPL-3

Encoding UTF-8

Imports ggplot2, readxl, utils

Suggests rmarkdown, knitr

VignetteBuilder knitr

Depends R (>= 3.5.0)

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Contents

Example_TimeR	2
Time.R_calc	3

Index	4
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Example_TimeR	<i>Series of watersheds characteristics used for testing the functions of the Time.R package.</i>
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Description

A dataset containing IDs, areas, slopes, basin lengths, elevations, curve numbers, manning coefficients, and paved status for a series of watersheds.

Usage

```
data(Example_TimeR)
```

Format

A data frame with 7 rows and 10 variables:

ID watersheds IDs

Area_km2 areas, in square kilometers

Slope_perc Slopes, in percentage

BasinLength_km Basin lengths, in kilometers

Z_max_masl Maximum elevations, in meters above sea level

Z_min_masl Minimum elevations, in meters above sea level

Z_ave_masl Average elevations, in meters above sea level

CurveNumber Curve numbers, dimensionless

ManningCoeff Manning coefficients, dimensionless

Paved Paved status, TRUE or FALSE

`Time.R_calc`*Calculate Time of Concentration and Lag Time*

Description

Estimates time of concentration and lag time for watersheds using various methods.

Usage

```
Time.R_calc(data, plot_watershed = FALSE, plot_formulas = FALSE)
```

Arguments

`data` A data frame containing watershed morphometric information. Required columns: watershed ID, area (km²), mean slope (%), basin length (km), max elevation (masl), min elevation (masl), average elevation (masl), curve number, manning coefficient, paved (TRUE/FALSE).

`plot_watershed` A logical value. If TRUE, plots a comparative ggplot for each watershed.

`plot_formulas` A logical value. If TRUE, plots a faceted ggplot to compare each formula for all watersheds.

Value

A data frame with calculated time of concentration and lag times.

Examples

```
# Load example data
data("Example_TimeR")

# Calculate time of concentration and lag time
Time.R_calc(Example_TimeR, plot_watershed = FALSE, plot_formulas = FALSE)

# Plot results by watersheds
Time.R_calc(Example_TimeR, plot_watershed = TRUE, plot_formulas = FALSE)

# Plot results by formulas
Time.R_calc(Example_TimeR, plot_watershed = FALSE, plot_formulas = TRUE)
```

Index

* **datasets**

Example_TimeR, [2](#)

Example_TimeR, [2](#)

Time.R_calc, [3](#)