# Package ‘rroad’

February 21, 2018

**Type** Package  

**Title** Road Condition Analysis  

**Version** 0.0.5  

**Date** 2018-02-20  

**Description** Computation of the International Roughness Index (IRI) given a longitudinal road profile. The IRI can be calculated for a single road segment or for a sequence of segments with a fixed length (e.g. 100m). For the latter, an overlap of the segments can be selected. The IRI and likewise the algorithms for its determination are defined in Sayers, Michael W; Gillespie, Thomas D; Queiroz, Cesar A.V. 1986. The International Road Roughness Experiment (IRRE) : establishing correlation and a calibration standard for measurements. World Bank technical paper; no. WTP 45. Washington, DC : The World Bank. (ISBN 0-8213-0589-1) available from <http://documents.worldbank.org/curated/en/326081468740204115>.  

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**URL** [http://github.com/vsimko/rroad](http://github.com/vsimko/rroad)  

**BugReports** [http://github.com/vsimko/rroad/issues](http://github.com/vsimko/rroad/issues)  

**LazyData** yes  

**Suggests** testthat, knitr, zoo, biwavelet  

**VignetteBuilder** knitr  

**RoxygenNote** 6.0.1  

**NeedsCompilation** no  

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**Repository** CRAN  

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CalculateIRIContinuously

Computes the IRI for a continuously increasing segment given a road profile

Description

Depending on the sample size a certain buffer has to be attached to the profile for calculation the slope at the end.

Usage

CalculateIRIContinuously(profile, iri_coef)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>profile</td>
<td>Road profile (as numeric vector in mm) whose IRIs are to be calculated.</td>
</tr>
<tr>
<td>iri_coef</td>
<td>Set of coefficients for specific sample size (e.g. IRI_COEF_250).</td>
</tr>
</tbody>
</table>

Value

Calculated IRIs (m/km) for increasing segments (as numeric vector) of the given profile.

Examples

```r
generate_test_profile <- function (x) {
  if (x < 1) return(0)
  if (x >= 1 & x < 3) return(x - 1)
  if (x >= 3 & x < 5) return(5 - x)
  if (x >= 5) return(0)
}
x <- seq(.25, 30, by = .25)
test_profile <- data.frame(x = x, profile = sapply(x, generate_test_profile))
test_profile$iri <- CalculateIRIContinuously(
  test_profile$profile, IRI_COEF_250)
plot(x = test_profile$x, y = test_profile$profile, ylim = c(0, 8),
  xlim = c(0, 25), type = "l")
lines(x = test_profile$x, y = test_profile$iri*10)
```
CalculateIRIperSegments

Computes the IRI for fixed length segments (e.g. 100m segments) given a road profile.

Description
Computes the IRI for fixed length segments (e.g. 100m segments) given a road profile.

Usage
CalculateIRIperSegments(profile, iri_coef, segment.length = 100)

Arguments
profile Road profile (as numeric vector in mm) whose IRI is to be calculated.
iri_coef Set of coefficients for specific sample size (e.g. IRI_COEF_100).
segment.length Distance (in m) for which the IRI is to be calculated. Default is 100 m.

Value
Calculated IRI (m/km) per segment (as numeric) of the given profile.

Examples
profile <- rnorm(10000)
iri <- CalculateIRIperSegments(profile, IRI_COEF_100, 20)
par(mfrow = c(1,2))
plot(profile, type="l",
     xlab="Distance [dm]", ylab="Profile [m]",
     main="Read profile (Laser measurement)"
)
plot(iri, type="s",
     xlab="Segment", ylab="IRI [m/km]",
     main="International Roughness Index (IRI)\nsample = 10cm, segment = 20m"
)

CalculateIRIperSegmentsOverlapping

Computes the IRI for fixed length overlapping segments (e.g. 100 m segments) with an offset (e.g. 20 m) given a road profile

Description
Computes the IRI for fixed length overlapping segments (e.g. 100 m segments) with an offset (e.g. 20 m) given a road profile.
Usage

CalculateIRIperSegmentsOverlapping(profile, iri_coef, segment.length = 100, segment.offset = 20)

Arguments

- **profile**: Road profile (as numeric vector in mm) whose IRI is to be calculated.
- **iri_coef**: Set of coefficients for specific sample size (e.g., IRI_COEF_100).
- **segment.length**: Distance (in m) for which the IRI is to be calculated. Default is 100 m.
- **segment.offset**: Offset (in m) for which the segments will not overlap. Default is 20 m.

Value

Calculated IRI (m/km) per segment (as numeric) of the given profile.

Examples

```r
profile <- rnorm(10000)
iri <- calculateIRIperSegments(profile, IRI_COEF_100, 20)
par(mfrow = c(1,2))
plot(profile, type="l", xlab="distance [dm]", ylab="profile [m]",
main="Read profile (Laser measurement)"
plot(iri, type="s", xlab="Segment (with 20 m offset)", ylab="IRI [m/km]", main="International Roughness Index (IRI)\nsample = 10cm, segment = 20m")
```

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IRI_COEF_100  | precomputed coefficients 100 mm segments (lazily evaluated promise)

Description

precomputed coefficients 100 mm segments (lazily evaluated promise)

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IRI_COEF_250  | precomputed coefficients 250 mm segments (lazily evaluated promise)

Description

precomputed coefficients 250 mm segments (lazily evaluated promise)
Index

CalculateIRIContinuously, 2
CalculateIRIPerSegments, 3
CalculateIRIPerSegmentsOverlapping, 3

IRI_COEF_100, 4
IRI_COEF_250, 4