Package 'RITM'

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Type Package

Title Irregular Terrain Modeling in R

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Description Point-to-
point and area mode irregular terrain modeling (ITM) in R based on the Longley-Rice Model.

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.1.1

NeedsCompilation no

R topics documented:

`areaT` *Area Mode Irregular Terrain Modeling*

Description

Returns path loss in Longley Rice area mode.

Usage

```
areaT(
  ModVar,
  deltaH,
  tht_m,
  rht_m,
  dist_km,
  TSiteCriteria,
  RSiteCriteria,
```

```
  eps_dielect,
  sgm_conductivity,
  eno_ns_surfref,
  frq_mhz,
  radio_climate,
  pol,
  pctTime,
  pctLoc,
  pctConf
)
```

Arguments

ModVar	One of: • 0 - Single: pctConf is "Time/Situation/Location", pctTime, pctLoc not used • 1 - Individual: pctTime is "Situation/Location", pctConf is "Confidence", pctLoc not used • 2 - Mobile: pctTime is "Time/Locations (Reliability)", pctConf is "Confidence", pctLoc not used • 3 - Broadcast: pctTime is "Time", pctLoc is "Location", pctConf is "Confidence"
deltaH	Terrain irregularity
tht_m	Transmit antenna height above ground, m
rht_m	Receive antenna height above ground, m
dist_km	Distance to calculate db loss (radius dist in km from tower)
TSiteCriteria	0 - random, 1 - careful, 2 - very careful
RSiteCriteria	0 - random, 1 - careful, 2 - very careful
eps_dielect	Soil dielectric
sgm_conductivity	Surface conductivity
eno_ns_surfref	Surface refractivity
frq_mhz	Frequency to calculate loss at (Hz)
radio_climate	1-Equatorial, 2-Continental Subtropical, 3-Maritime Tropical, 4-Desert, 5-Continental Temperate, 6-Maritime Temperate, Over Land, 7-Maritime Temperate, Over Sea
pol	Polarization. 0-Horizontal, 1-Vertical
pctTime	Varies. (see parameter ModVar)
pctLoc	Varies. (see parameter ModVar)
pctConf	Varies. (see parameter ModVar)

Value

Path loss (dB) and needed calculations for path loss

Examples

```
ModVar = 3;
deltaH = 90;
tht_m = 100;
rht_m = 10;
dist_km = 20;
TSiteCriteria = 0;
RSiteCriteria = 0;
eps_dielect = 15;
sgm_conductivity = 0.005;
eno_ns_surfref = 301;
frq_mhz = 145;
radio_climate = 1;
pol = 1;      #1 = vert
pctTime = 0.5;
pctLoc = 0.5;
pctConf = 0.9;

areaT(ModVar, deltaH, tht_m, rht_m, dist_km, TSiteCriteria, RSiteCriteria,
eps_dielect, sgm_conductivity, eno_ns_surfref,frq_mhz, radio_climate, pol, pctTime, pctLoc,
pctConf)$dbloss
```

`point_to_point` *Point to Point ITM*

Description

Returns path loss in Longley Rice point-to-point mode. Best for rural areas.

Usage

```
point_to_point(struct_Input)
```

Arguments

`struct_Input` Named list object of input parameters:

- Frequency - Frequency to calculate loss at (Hz)
- Elevation - terrain elevation profile, (list of points) (m)
- Resolution - terrain input resolution (distance b/t points) (m)
- TX_Height - Transmit antenna height above ground (m)
- RX_Height - Recieve antenna height above ground (m)
- eps - Soil dielectric
- sgm - Surface conductivity
- surfref - Surface refractivity
- Climate - Climate, 1-Equitorial, 2-Continental Subtropical, 3-Maritime Tropical, 4-Desert
- Polarization - 1 is vertical, 0 is horizontal.
- Confidence - confidence for statistical analysis (.01 to .99)
- Reliability - Reliability to calculate statistics for (.01 to .99)

Value

Path loss (dB), error ID, error message, and mode.

Examples

```
#commented below is an example of how to get an elevation profile in R.
#library(elevatr)
#library(sp)
#set.seed(65.7)
#examp_df <- data.frame(x = runif(3, min = -73, max = -72.5), y = runif(3, min = 42,  max = 43))
#prj_dd <- "+init=EPSG:4326"
#cats <- data.frame(category = c("H", "M", "L"))
#examp_df2 <- data.frame(examp_df, cats)
#examp_sp <- SpatialPoints(examp_df, proj4string = CRS(prj_dd))
#examp_spdf <- SpatialPointsDataFrame(examp_sp, data = cats)
#df_elev_epqs <- get_elev_point(examp_df, prj = prj_dd, src = "epqs")
#Elevation<-df_elev_epqs$elevation

#These are the values returned above:
Elevation<-c(207.81, 198.95, 306.15)

#Build the input list
struct_Input<-list()
struct_Input$Frequency<-120*1000000 #Frequency to calculate loss at (Hz)
struct_Input$Elevation<-Elevation #terrain elevation profile, (list of points) (m)
struct_Input$Resolution<-40000 #terrain input resolution (distance b/t points) (m)
struct_Input$TX_Height<-3 #Transmit antenna height above ground (m)
struct_Input$RX_Height<-100 #Recieve antenna height above ground (m)
struct_Input$eps<-15 #Soil dielectric
struct_Input$sgm<-.005 #Surface conductivity
struct_Input$surfref<-301 #Surface refractivity
struct_Input$Climate<-5
struct_Input$Polarization<-1 #1 is vertical, 0 is horizontal
struct_Input$Confidence<-.95 #confidence for statistical analysis
struct_Input$Reliability<-.95 #Reliability to calculate statistics for (.01 to .99)

point_to_point(struct_Input)
```

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