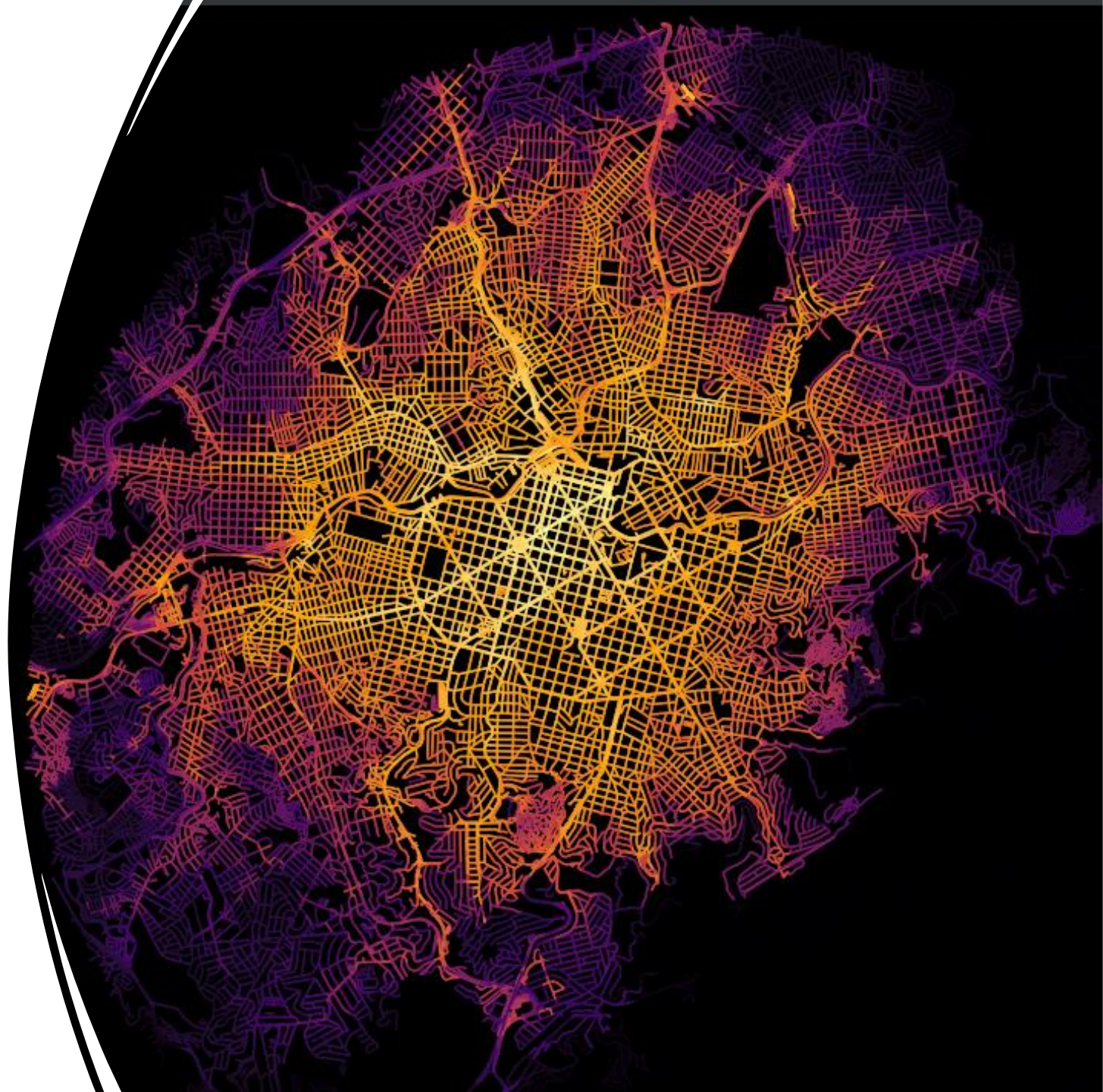


A crash course on Urban accessibility with R

Rafael H. M. Pereira

 @UrbanDemog

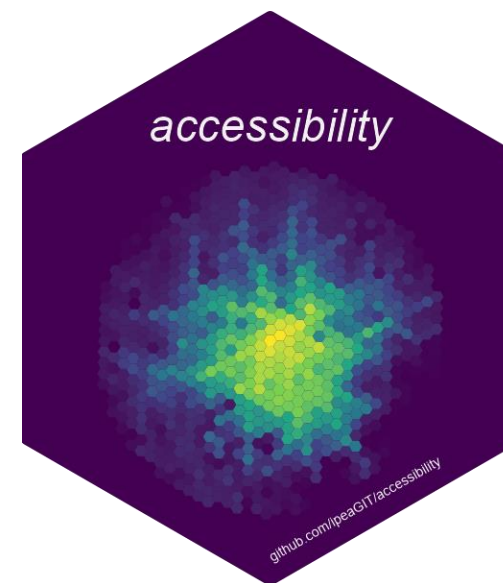
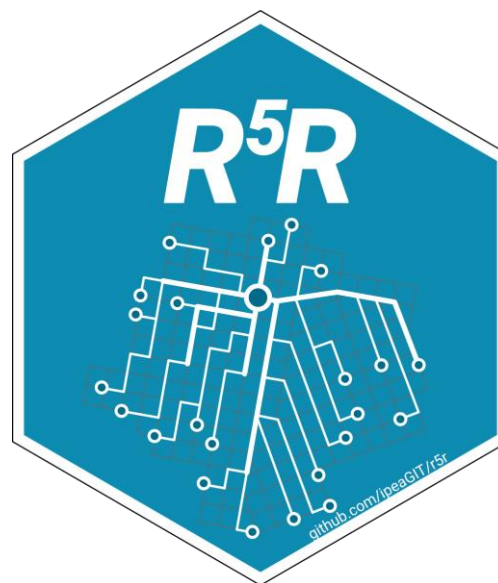
Calculating Accessibility



Purpose of the chapter

Chapt. 3

To show how to calculate urban accessibility estimates in **R** using the `{r5r}` and `{accessibility}` packages





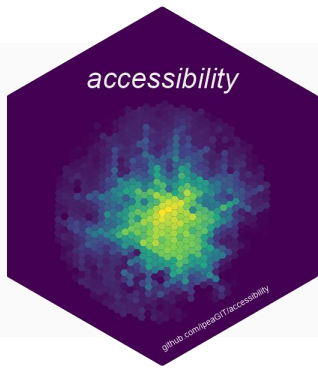
Intro to {r5r} use steps-by-step

1. Building a routable transport network
2. Accessibility: quick and easy approach
3. Accessibility: flexible approach
 - a) Travel time matrix
 - b) Calculate access

Lets' code



[Link](#) to replex with sample data



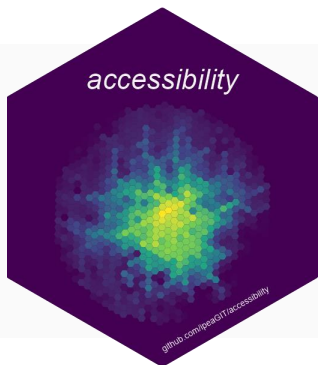
accessibility: transport accessibility metrics

CRAN 1.0.1 downloads 1317 GitHub code

<https://ipeagit.github.io/accessibility>



A set of efficient and convenient functions for calculating accessibility indicators



accessibility: transport accessibility metrics

CRAN

1.4.0

downloads

15K

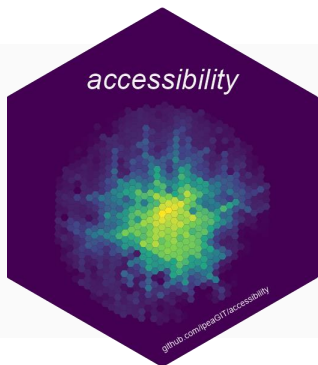
GitHub

code

<https://ipeagit.github.io/accessibility>

Several place-based measures:

- `cost_to_closest()`
- `cumulative_cutoff()`
- `cumulative_interval()`
- `floating_catchment_area()`
- `gravity()`
- `spatial_availability()`
- `balancing_cost()`



accessibility: transport accessibility metrics

CRAN 1.4.0

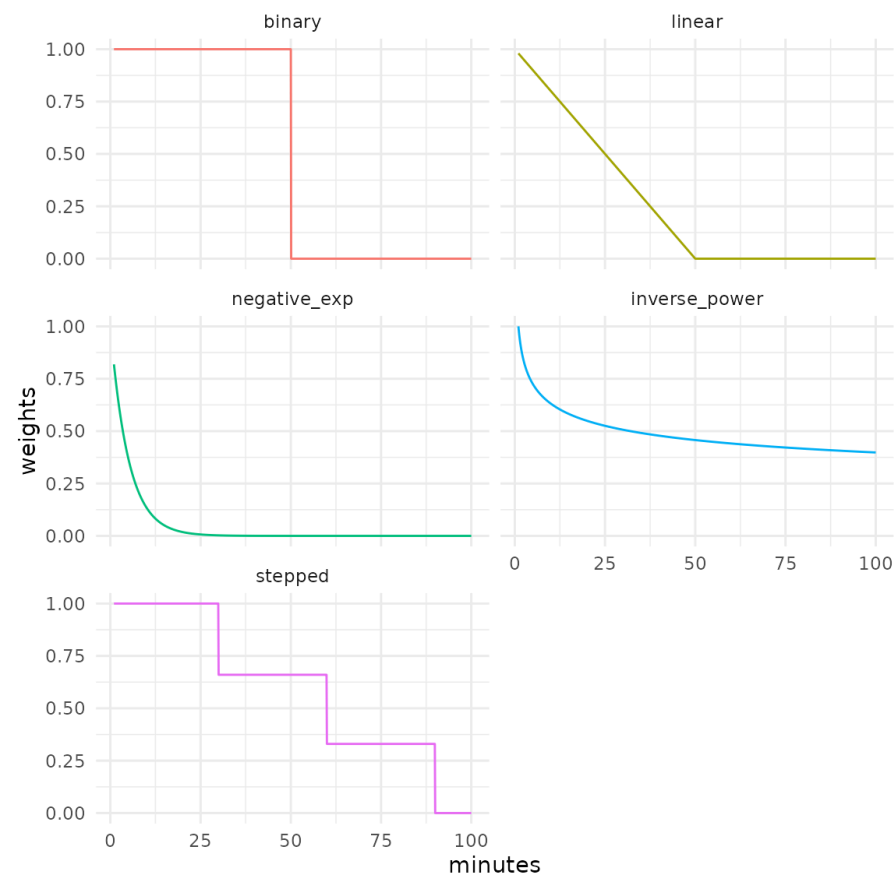
downloads 15K

GitHub code

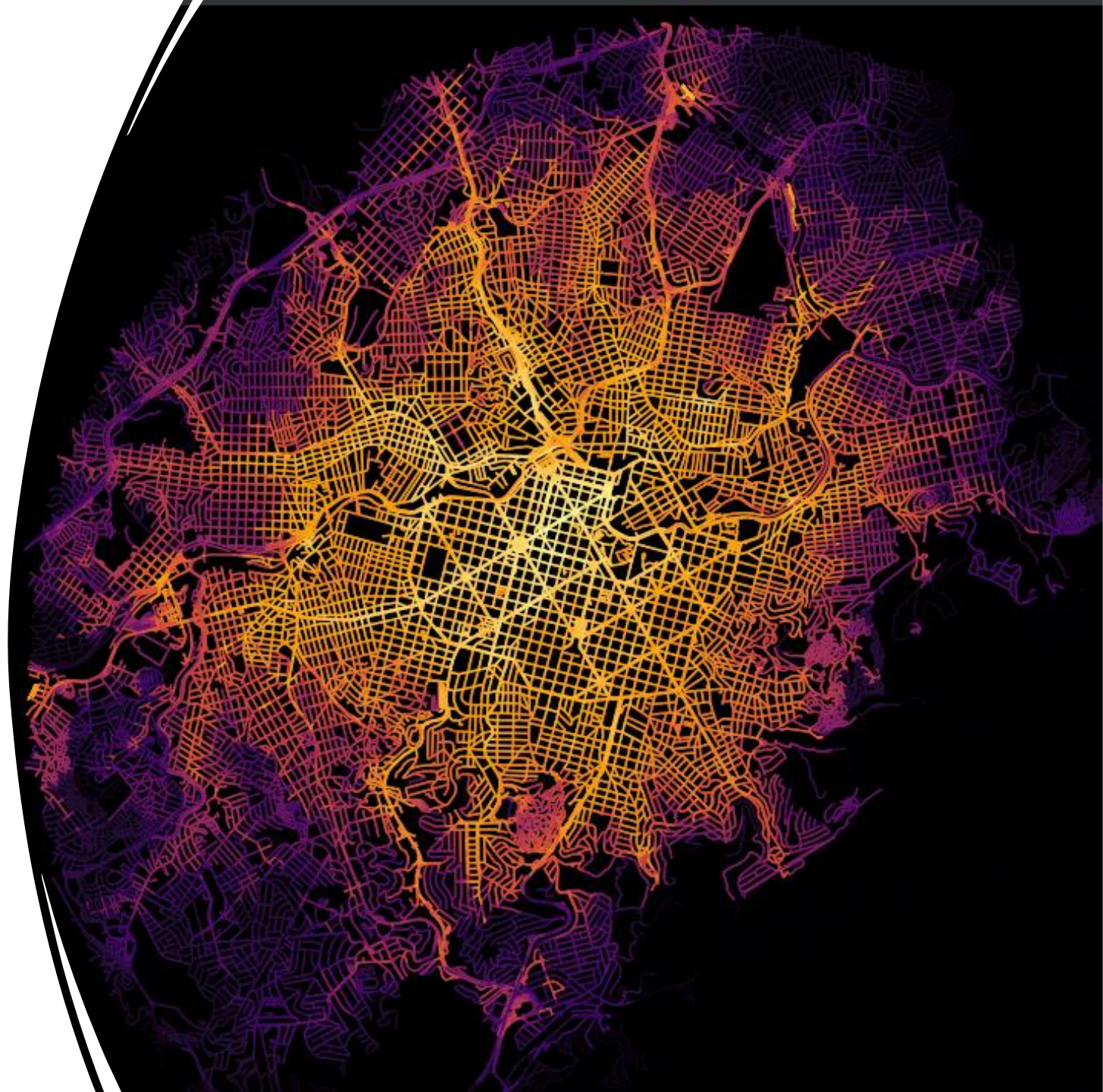
<https://ipeagit.github.io/accessibility>

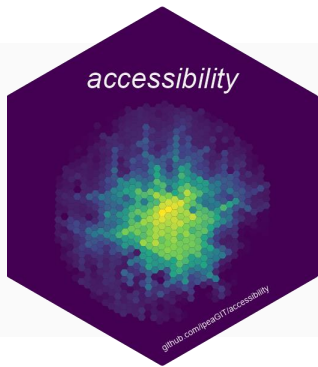
Several decay functions:

- `decay_binary()`
- `decay_exponential()`
- `decay_linear()`
- `decay_logistic()`
- `decay_power()`
- `decay_stepped()`



Accessibility inequality and poverty





accessibility: transport accessibility metrics

CRAN 1.4.0

downloads 15K

GitHub code

<https://ipeagit.github.io/accessibility>

Inequality indicators:

- `concentration_index()`
- `gini_index()`
- `palma_ratio()`
- `theil_t()`

Poverty indicators:

- `fgt_poverty()`

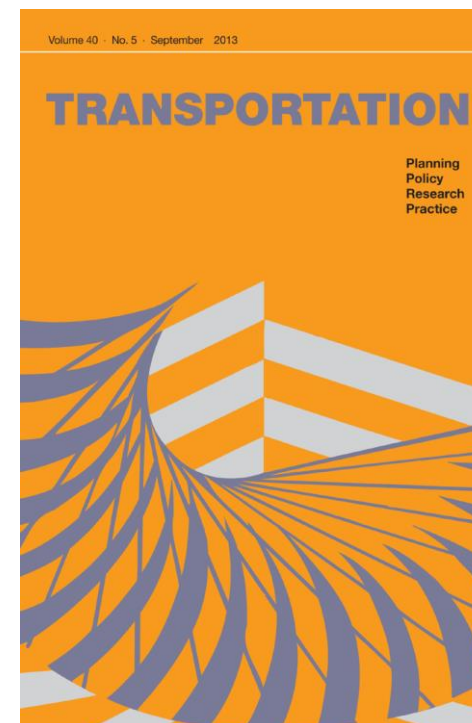
All 3 Foster-Greer-Thorbecke (FGT) poverty measures



Karner, A., Pereira, R. H., & Farber, S. (2024). **Advances and pitfalls in measuring transportation equity.** [Transportation](#)

Inequality indicators:

1. ~~Gini index~~ it ignores groups' rankings*
2. Theil index ! only Ok for categorical groups*
3. Palma ratio ignores variations within groups
4. Concentration index
 - Same intuition as Gini/Lorenz *but* population along the x-axis is ordered by a socioeconomic variable
 - Varies from -1 to 1





Karner, A., Pereira, R. H., & Farber, S. (2024). **Advances and pitfalls in measuring transportation equity.** [Transportation](#)

FGT family of **Poverty** indicators:

FGT_0 : **extent** of poverty

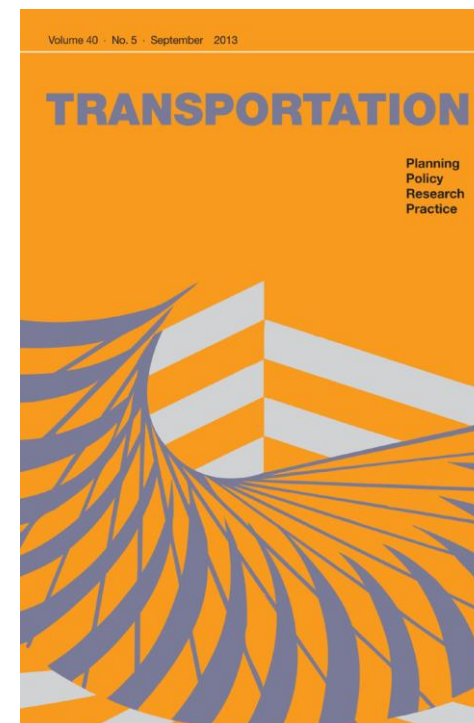
Number of people below poverty line

FGT_1 : **severity** of poverty

Average percent distance between the poverty line and the accessibility of individuals below it

FGT_2 : **extent** and **severity**

The number of people below the poverty line weighted by the size of the accessibility shortfall (higher weight on the poverty of the poorest)



Lets' code



[Link](#) to replex with sample data