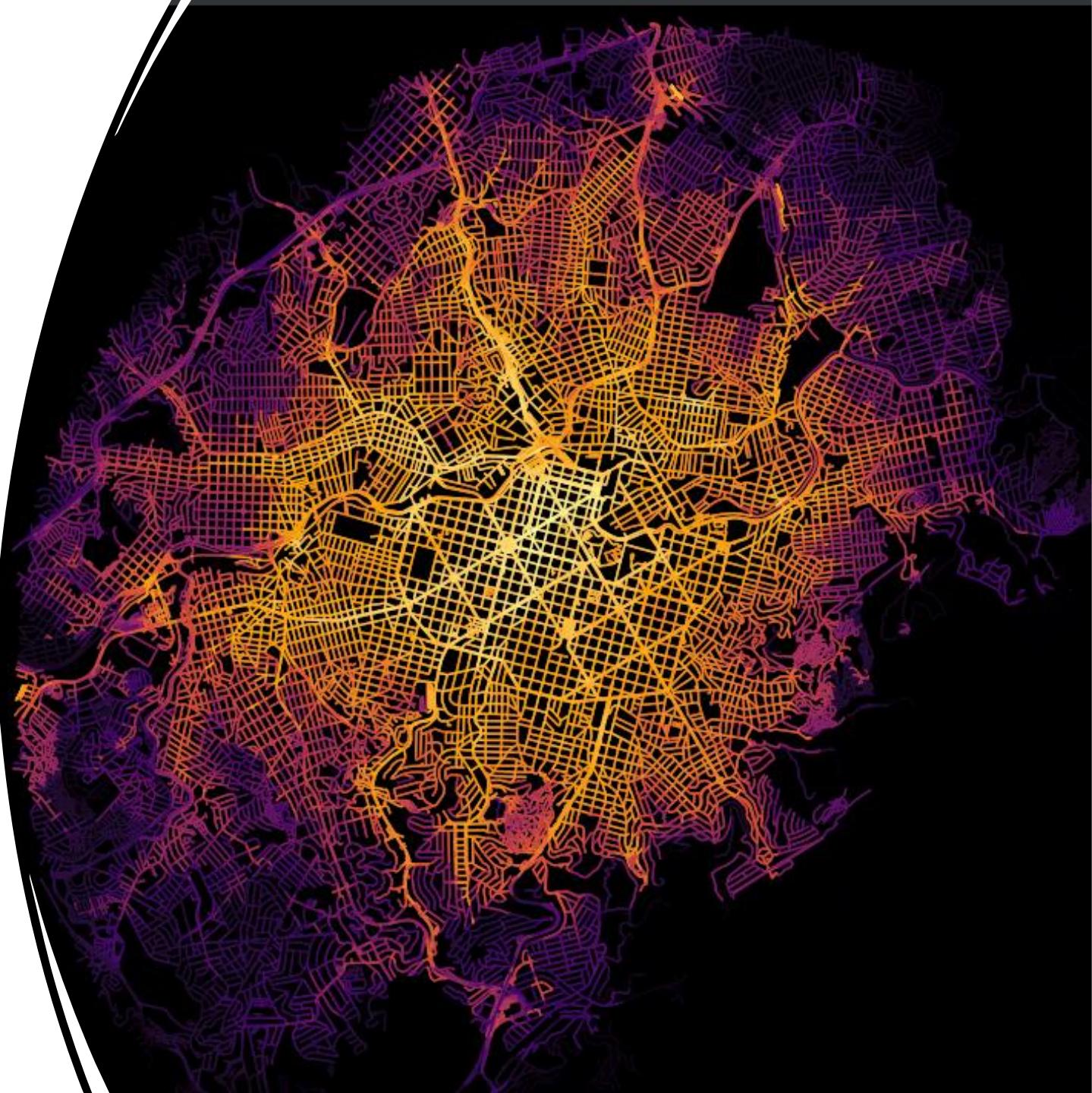


# A crash course on Urban accessibility with R

Rafael H. M. Pereira

 @UrbanDemog

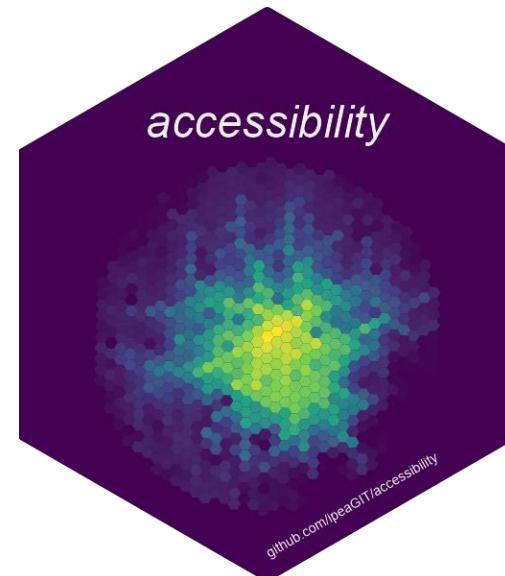
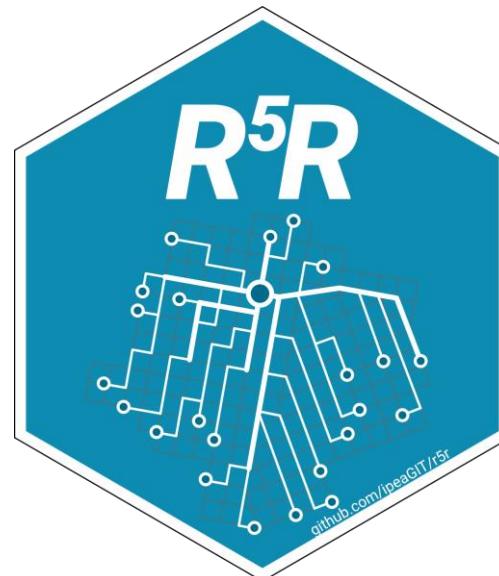
# Calculating Accessibility

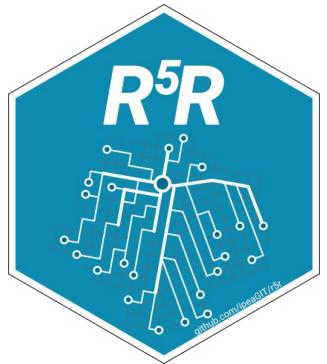


# Purpose of the chapter

Chapt. 3

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





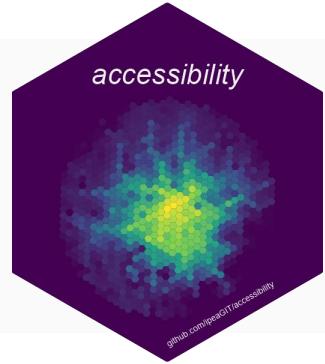
# Intro to {r5r} use steps-by-step

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 reprex with sample data



# accessibility: transport accessibility metrics

CRAN 1.4.0

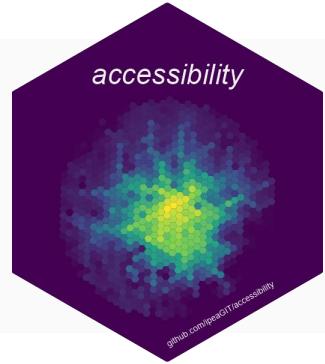
downloads 28K

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

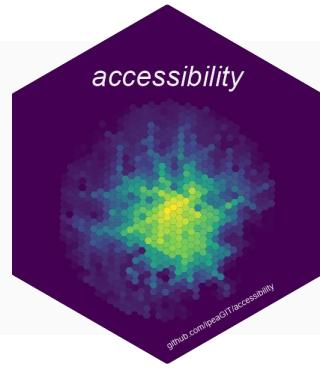
downloads 28K

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

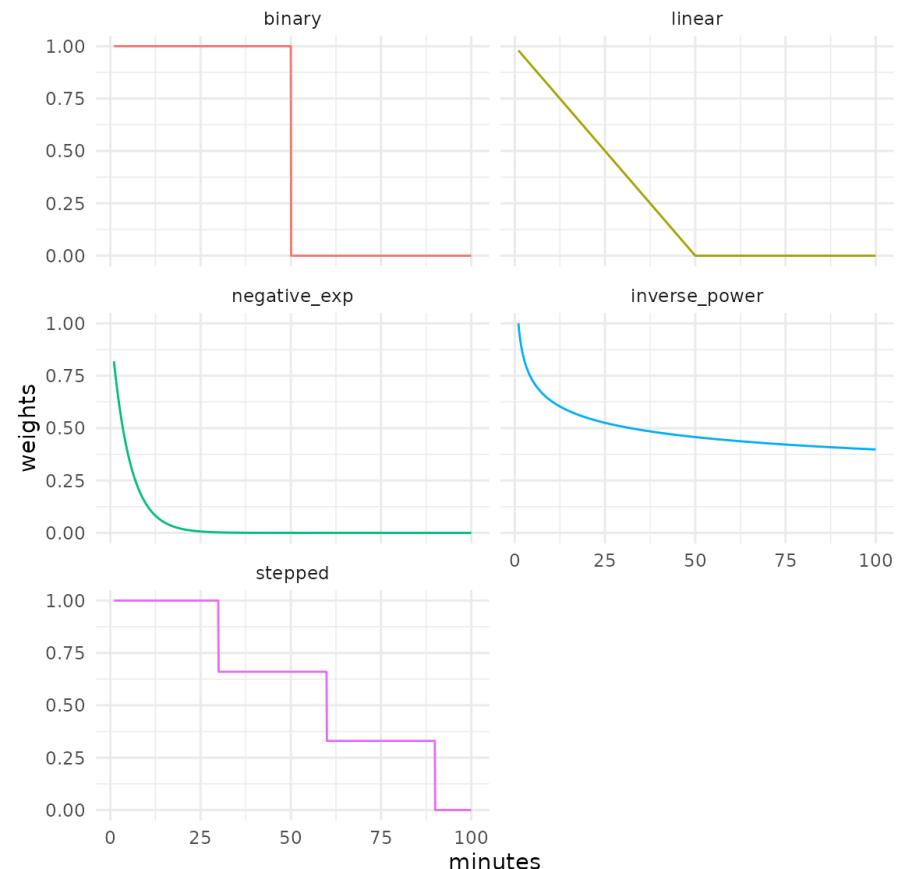
downloads 28K

Github code

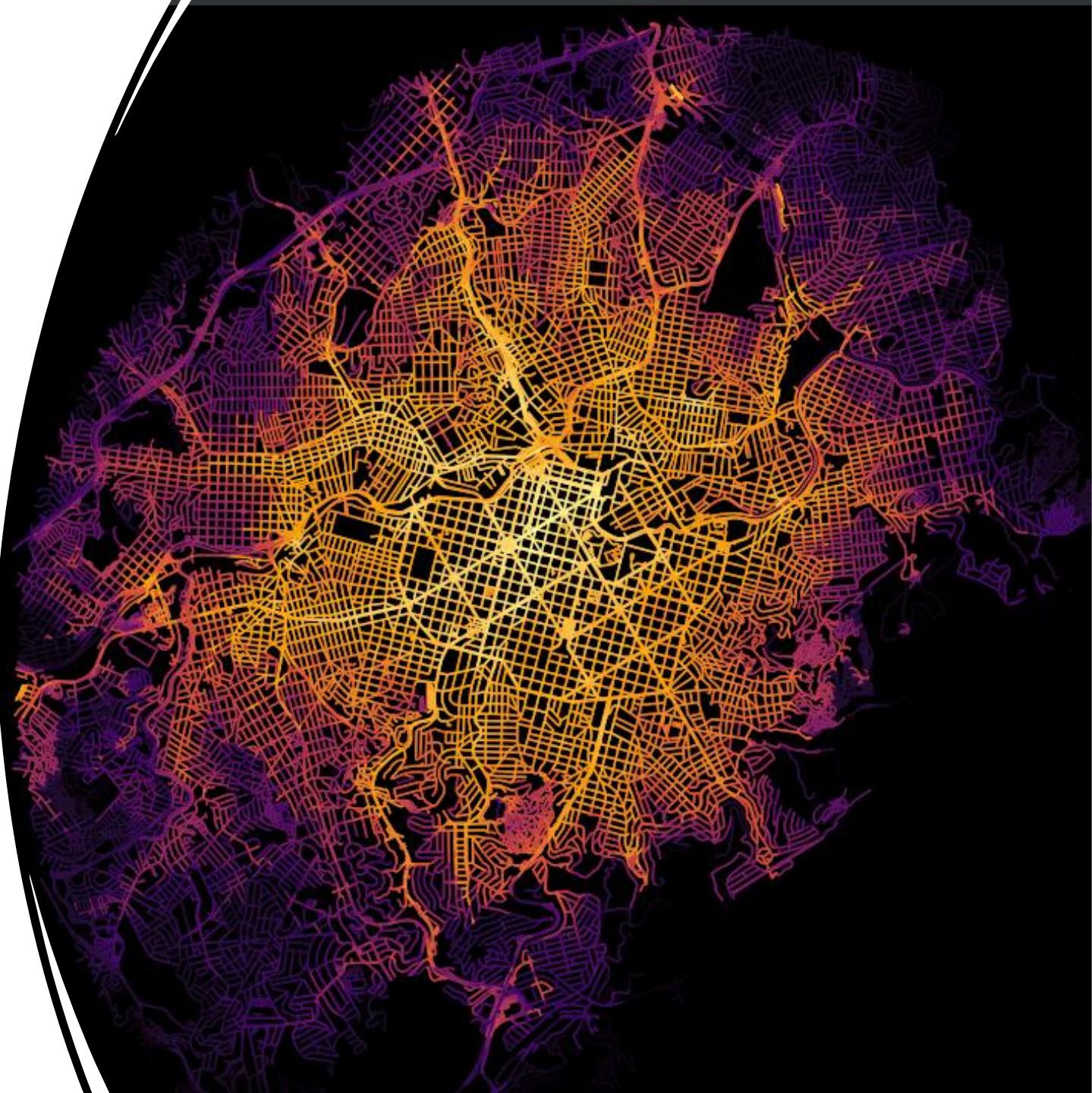
<https://ipeagit.github.io/accessibility>

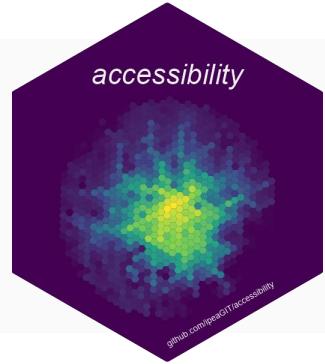
Several decay functions:

- `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 28K

Github code

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

## Inequality indicators:

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

## Poverty indicators:

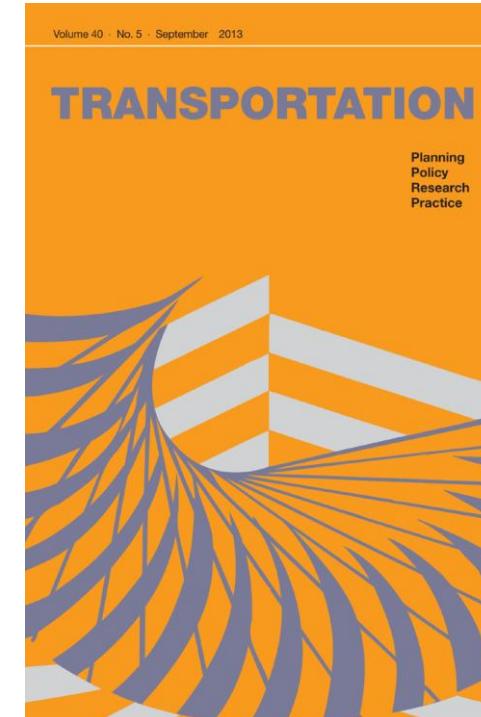
- `fgt_poverty()`  
All 3 Foster-Greer-Thorbecke (FGT) poverty measures



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*

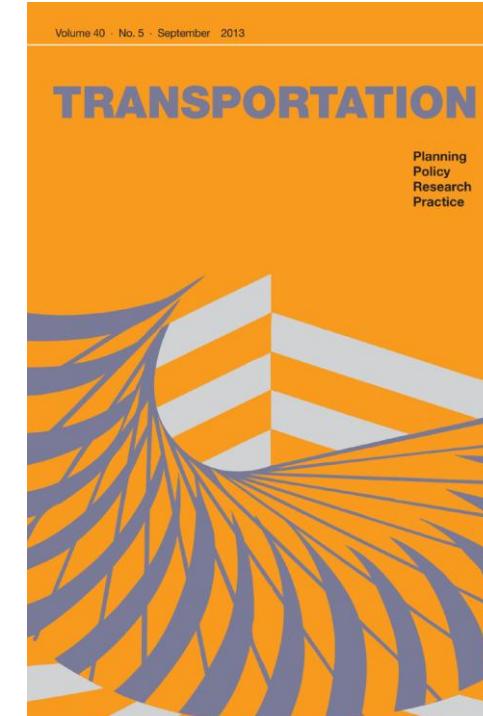
## FGT family of Poverty indicators:

FGT<sub>0</sub> : *extent* of poverty

Number of people below poverty line

FGT<sub>1</sub> : *severity* of poverty

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



FGT<sub>2</sub> : *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 reprex with sample data