A crash course on
Urban accessibility with R

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@UrbanDemog
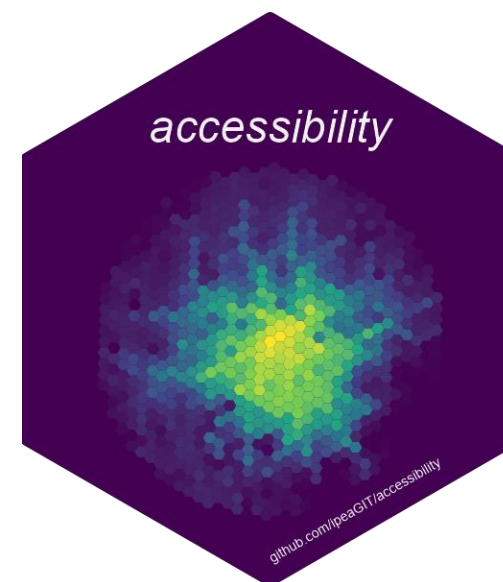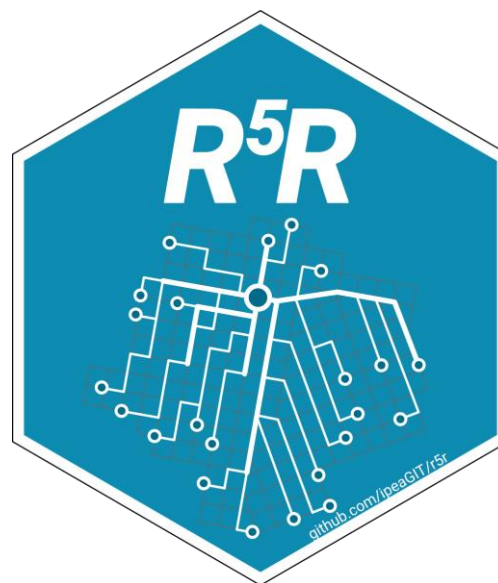
ipea **Institute for Applied Economic Research**
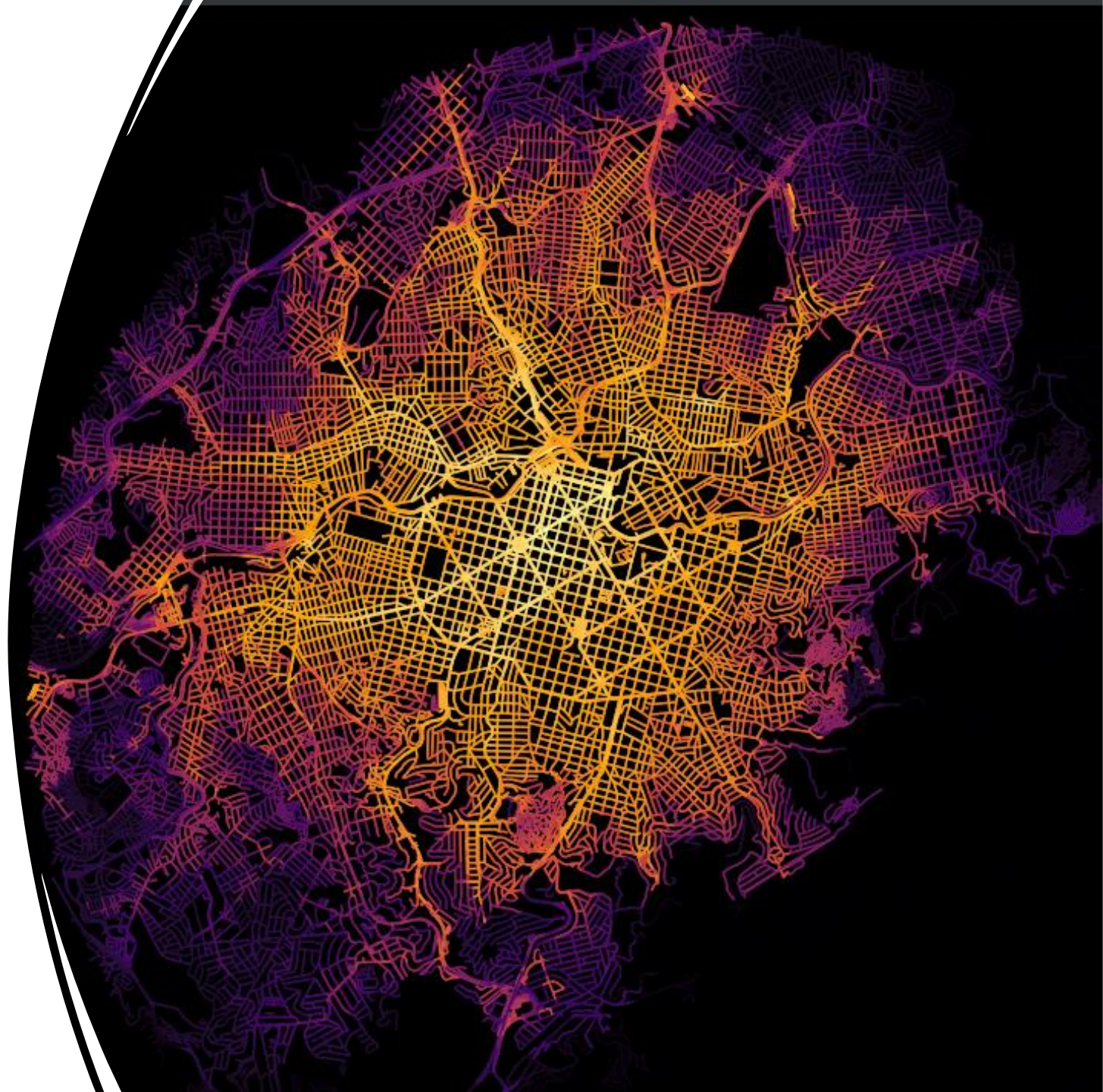
Calculating Accessibility

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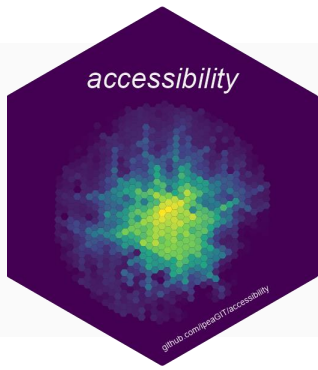

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Intro to {r5r} use steps-by-step

1. Building a routable transport network

2. Accessibility: quick and easy approach

3. Accessibility: flexible approach
   a) Travel time matrix
   b) Calculate access

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Lets' code »

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accessibility: transport accessibility metrics

https://ipeagit.github.io/accessibility

A set of efficient and convenient functions for calculating accessibility indicators
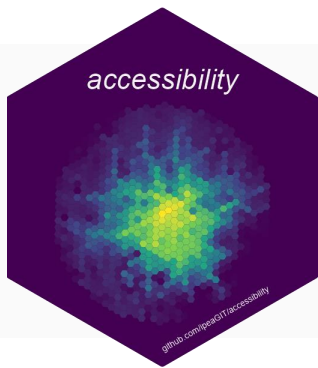
Several place-based measures:

- `cost_to_closest()`

- `cumulative_cutoff()`

- `cumulative_interval()`

- `floating_catchment_area()`

- `gravity()`

- `spatial_availability()`

- `balancing_cost()`

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accessibility: transport accessibility metrics
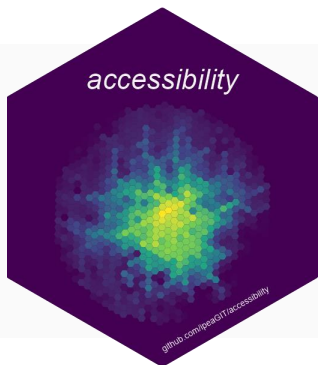
accessibility

github.com/ipeaGIT/accessibility

CRAN 1.4.0   downloads 15K   GitHub code

https://ipeagit.github.io/accessibility
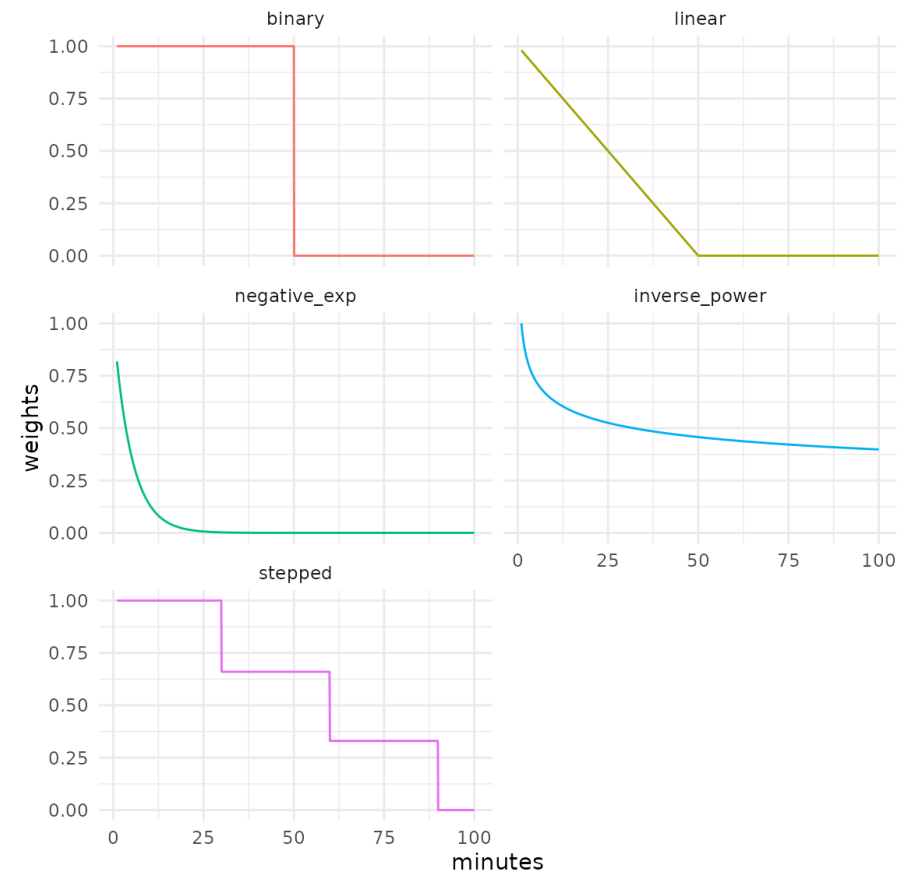
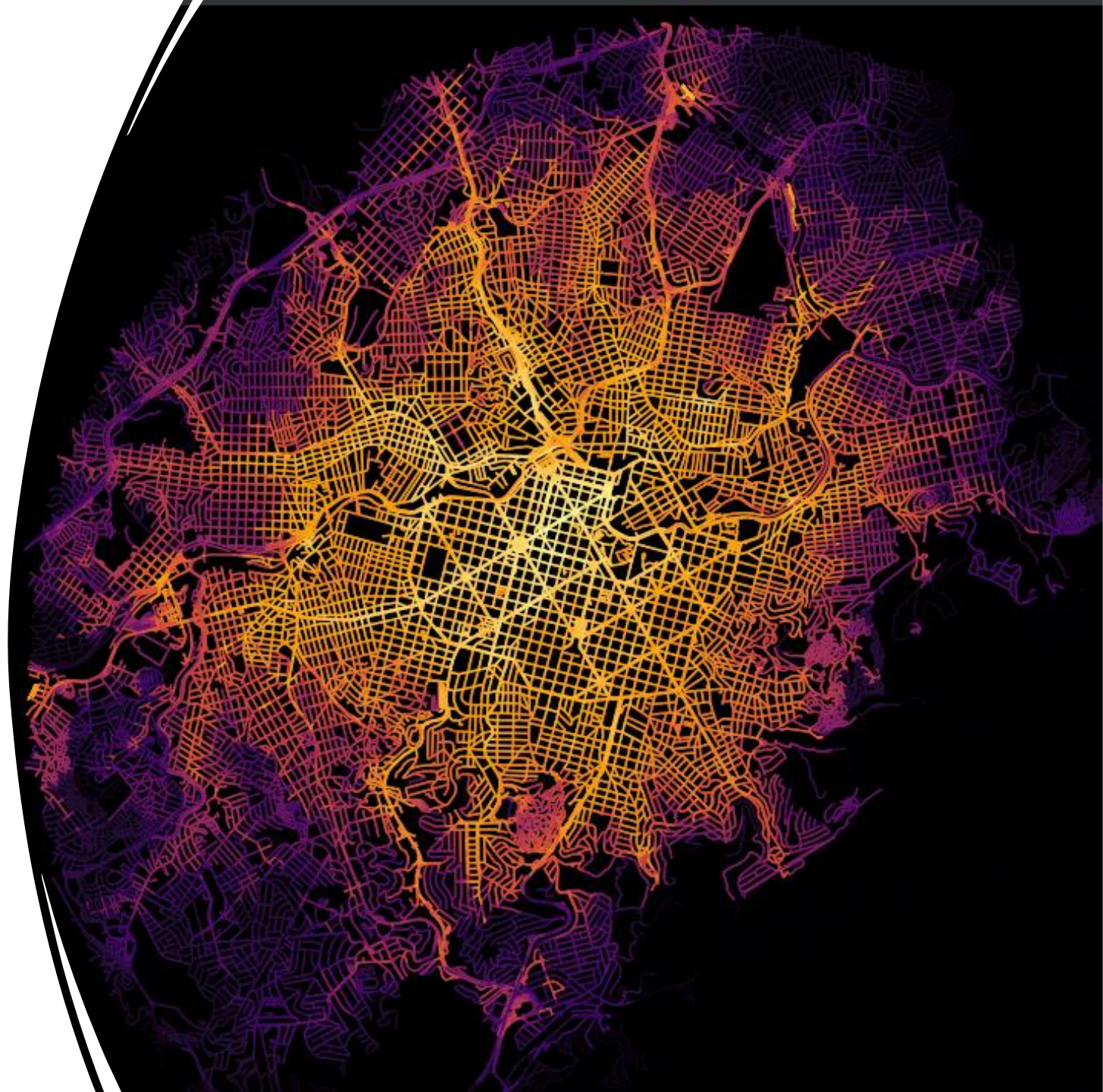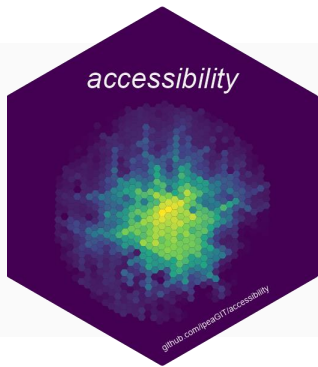## Several decay functions:

- decay_binary()

- decay_exponential()

- decay_linear()

- decay_logistic()

- decay_power()

- decay_stepped()

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Accessibility inequality and poverty

accessibility: transport accessibility metrics

https://ipeagit.github.io/accessibility

Inequality indicators:

- `concentration_index()`

- `gini_index()`

- `palma_ratio()`

- `theil_t()`

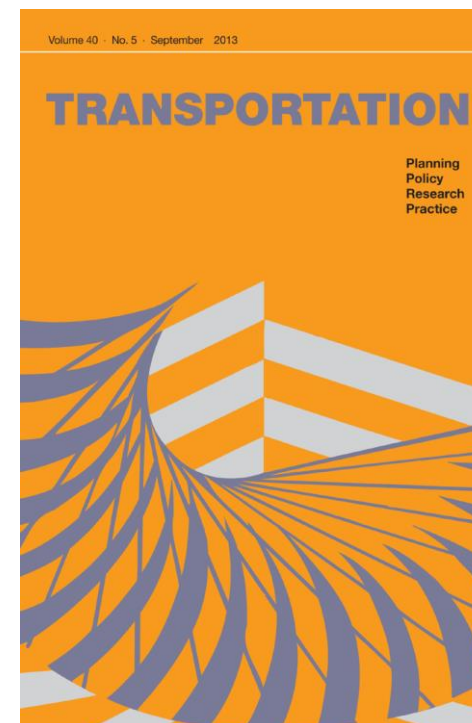## Poverty indicators:

- `fgt_poverty()`

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

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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

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FGT family of Poverty indicators:
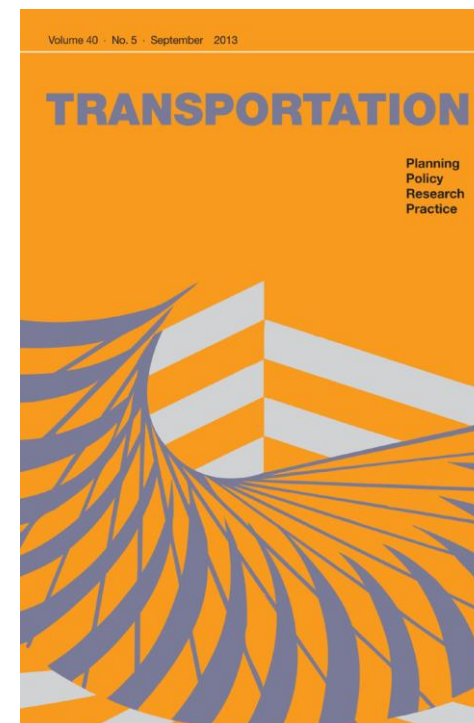
FGT_0 : *extent* of poverty

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

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[Link](#) to reprex with sample data

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