A crash course on

Urban accessibility with R

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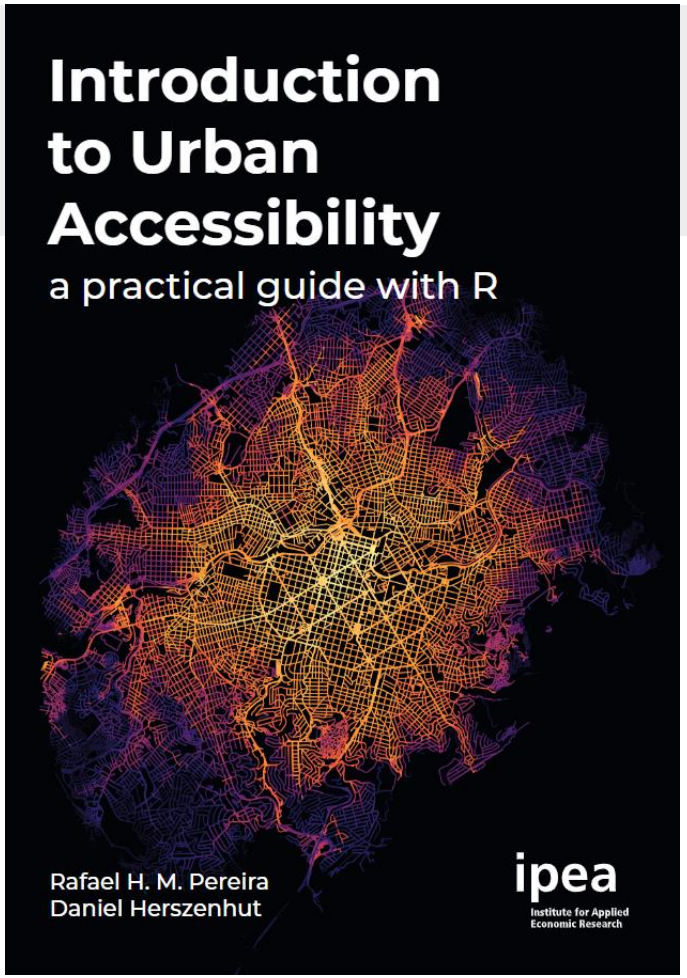
Core teaching material:



Aim:

To equip its readers with the fundamental concepts, the data analysis skills needed to perform urban accessibility analyses and and project evaluations

Hands-on approach:

- Methodology and data analysis guide-book
- Reproducible examples in R
- Open software and data

https://ipeagit.github.io/intro_access_book/

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Overview of the book

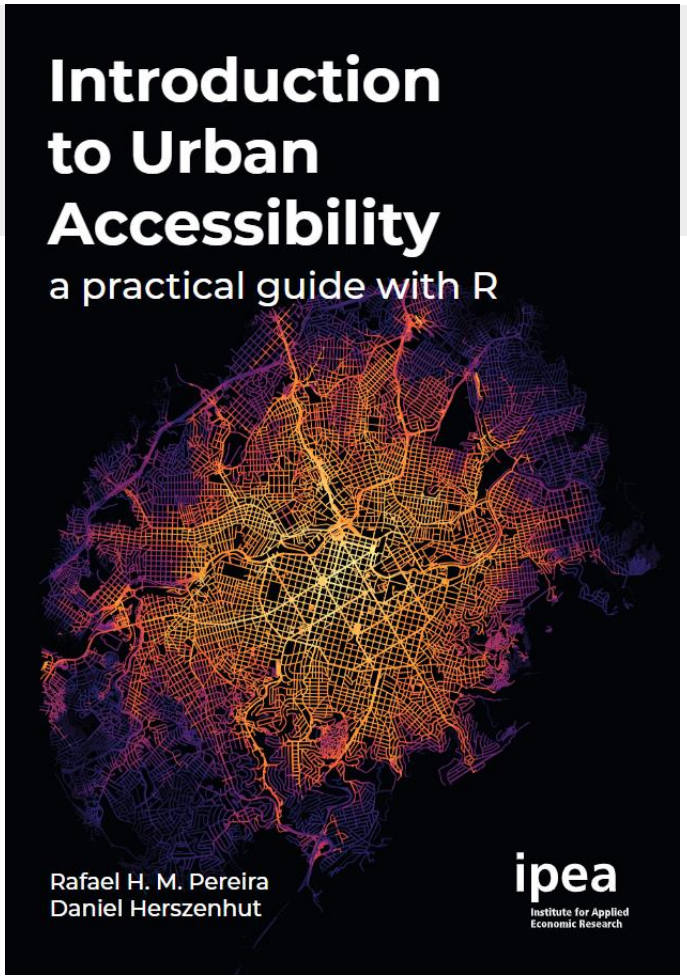
Section 1:
Introduction to urban accessibility (concepts)

Section 2:
Calculating accessibility

Section 3:
Public transport data in GTFS

Section 4:
Impact assessment of transportation projects

Section 5:
Data from the Access to Opportunity Project (AOP)



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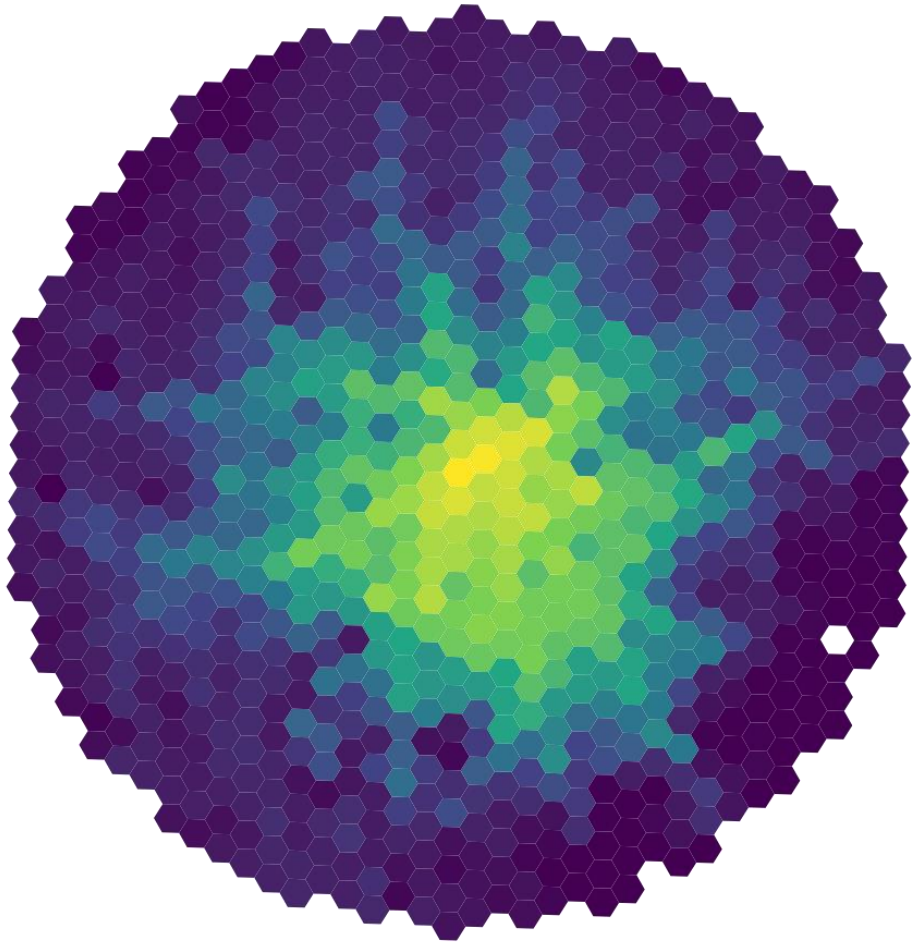
What we will cover:

- Data and computational requirements

- How to calculate:
  - Travel time matrices
  - Accessibility estimates

  - Accessibility poverty
  - Accessibility inequality



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What we will *not* cover:

Intro-level content we assume you're already familiar with

Advanced topics we will not cover and which are not required to follow the workshop

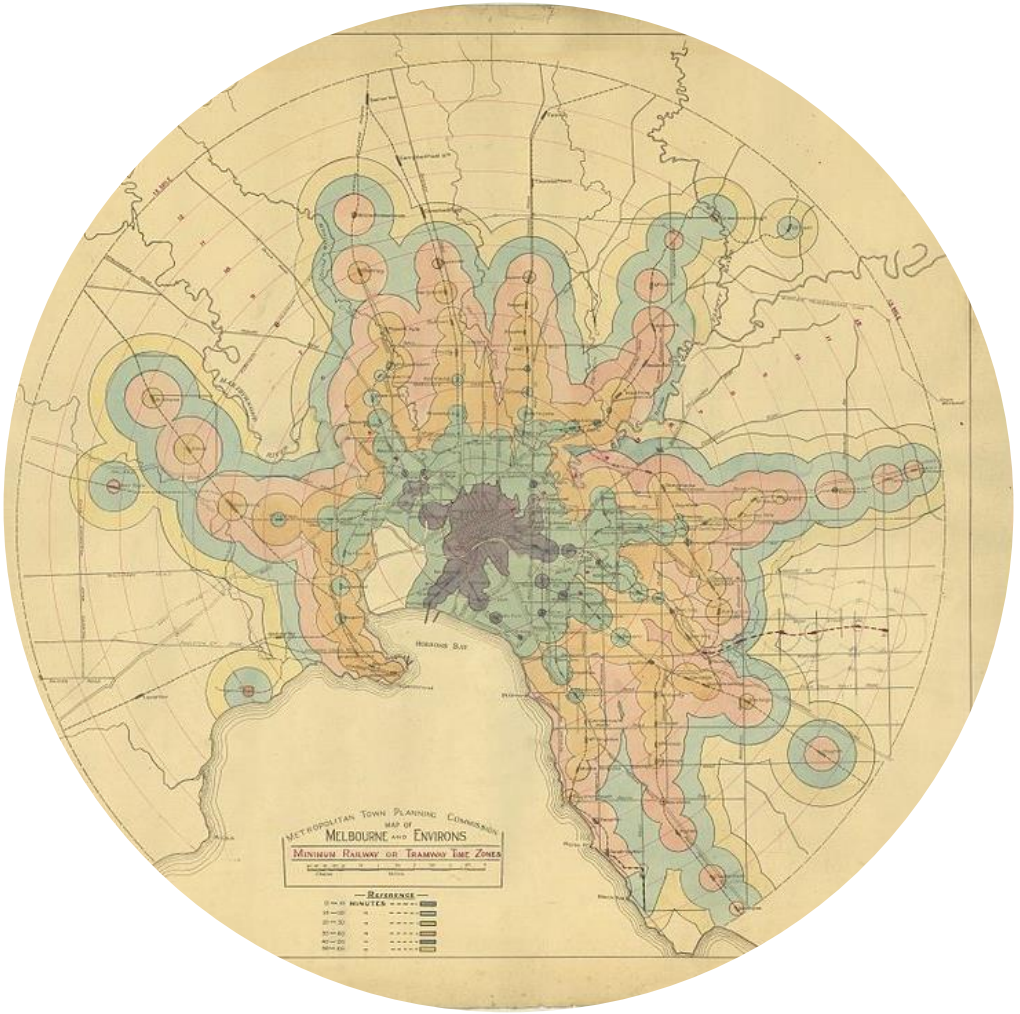

Image: isochrone map of Melbourne by rail, 1910-1922

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Why does accessibility matter?

the role of access in inclusive and sustainable cities

Sufficientarian:

It is essential for the satisfaction of **basic needs**

Egalitarian:

It reveals the spatial dimension of **inequality of opportunities**

Human development:

It provides the **freedom** necessary to **participate in activities and develop other human capabilities**

Environmental:

It shapes travel choices towards more (or less) **sustainable mobility patterns**

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Types of accessibility measures

Place-based metrics

Person-based metrics

Image credit: freepik bookzv

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Cumulative accessibility metric

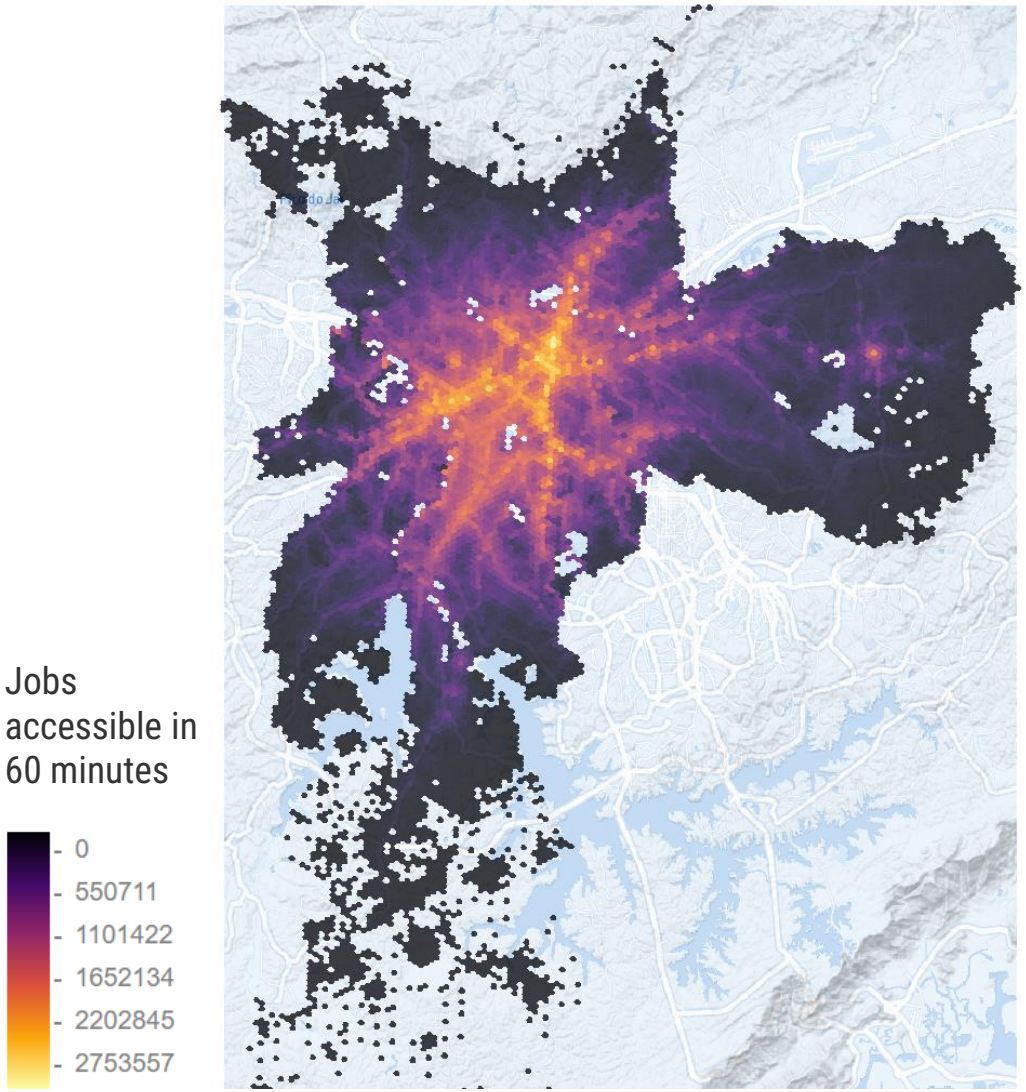

Image credit: ipea.gov.br/ acessooportunidades/en/

Cumulative opportunity measures:

The number of opportunities that can be reached within a given travel cost limit

Advantages:

- Easy to calculate and communicate
- Litter data requirements

Disadvantages:

- Does not consider the competition for opportunities
- Requires choosing a single (arbitrary) travel time threshold
- Ignores cost gradients within time threshold

$$A_i = \sum_{j=1}^{n} O_j \times f(c_{ij})$$

$$f(c_{ij}) = \begin{cases} 1 & \text{if } c_{ij} \leq C \\ 0 & \text{otherwise} \end{cases}$$

in which A_i is accessibility at origin i, O_j is the number of opportunities at destination j, n is the total number of destinations in the study area, $f(c_{ij})$ is a binary function that assumes the values 0 or 1, depending on the travel cost c_{ij} between origin i and destination j and C is the travel cost threshold.

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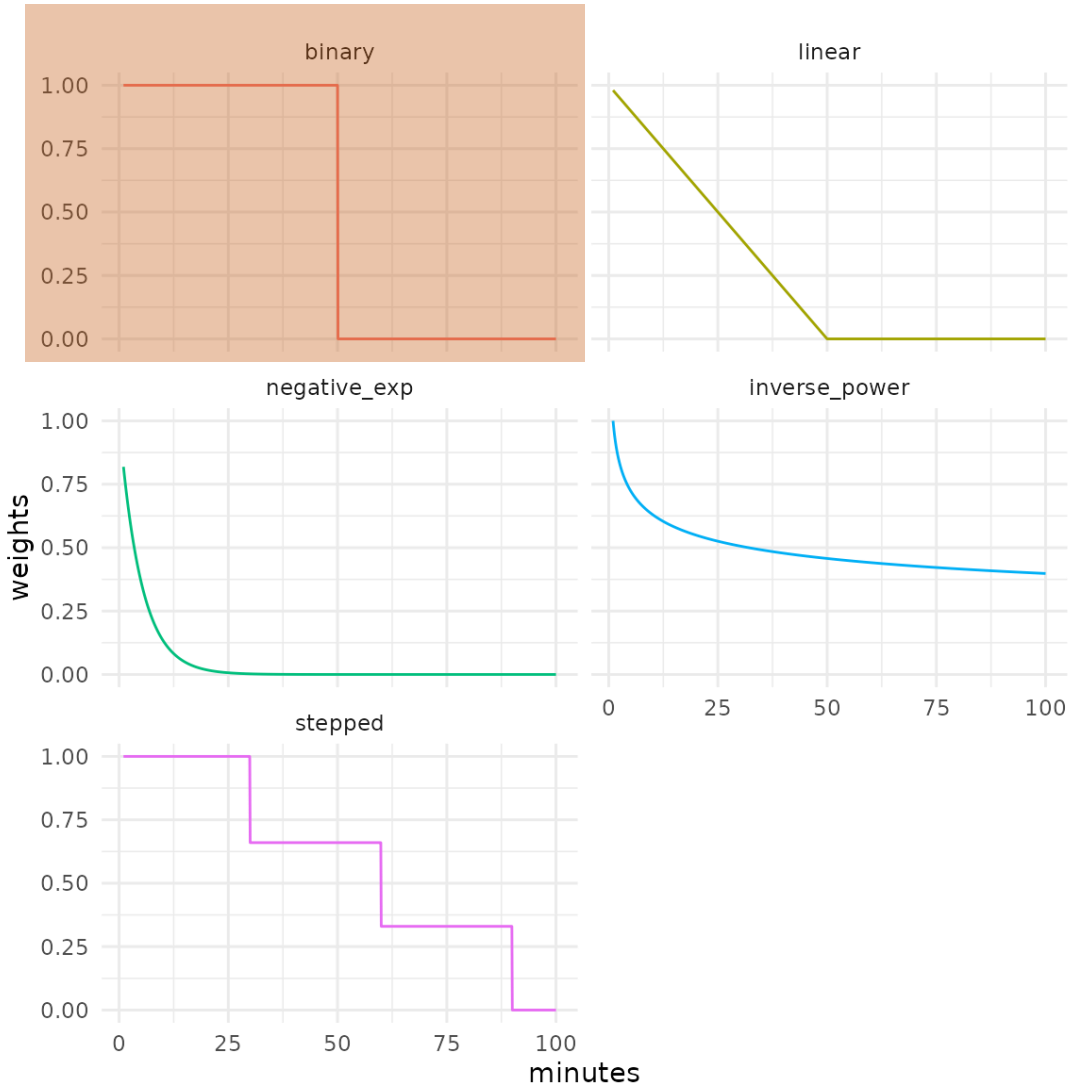
Access metrics and decay functions



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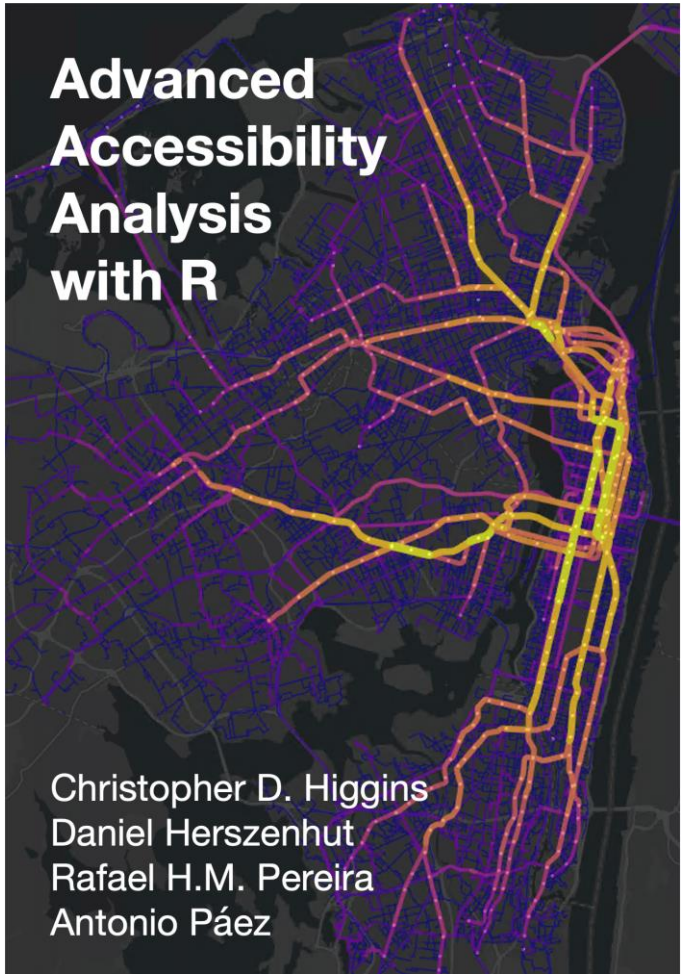
Advanced topics in accessibility

These will be covered in a new book (in progress)

Under contract with Routledge

- Spatial biases - MAUP
- Temporal biases - MTUP
- Access metrics with competition
- Calibration of impedance functions
- Monetary costs
- Single Vs Multiple Cost Measures
- Big (larger-than-memory) data



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