statistical book

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2025-05-04

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Preface

This is a Quarto book.

To learn more about Quarto books visit https://quarto.org/docs/books.

```
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```

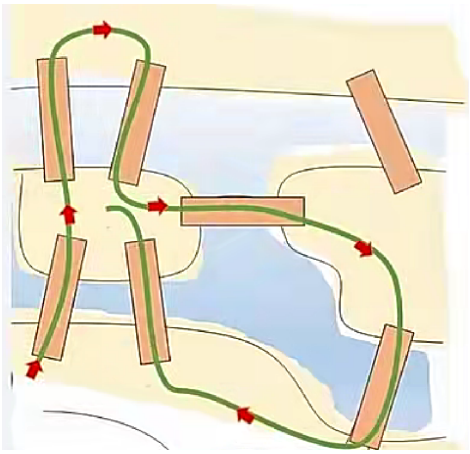
```
[1] 2
```

1 Statistics

1.1

1.1.1 :

?



1736 *Solutio problematis ad geometriam situs pertinents* , .

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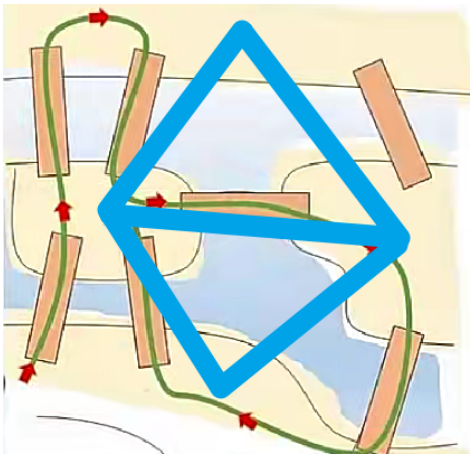

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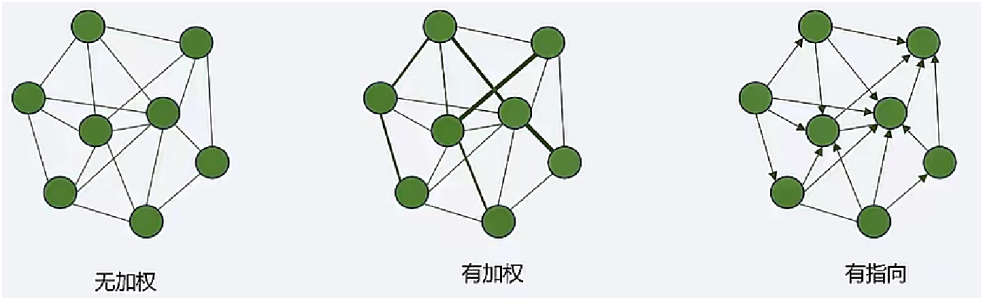
This method created **Graph Theory**, which is the basics of the network analysis. The Graph Theory is studying the association between dots and edges.

The edges have **directions(digraph)** or **none directions(undigraph)** and **weight** representing the strength of relationship.

The main categories of network:



1.1.2 Code demo:

```
library(igraph)
```

```
Attaching package: 'igraph'
```

```
The following objects are masked from 'package:stats':
```

```
    decompose, spectrum
```

```
The following objects are masked from 'package:lubridate':

    %--%, union

The following objects are masked from 'package:dplyr':

    as_data_frame, groups, union

The following objects are masked from 'package:purrr':

    compose, simplify

The following object is masked from 'package:tidyr':

    crossing

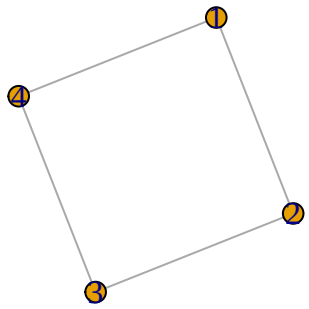
The following object is masked from 'package:tibble':

    as_data_frame

The following object is masked from 'package:base':

    union
```

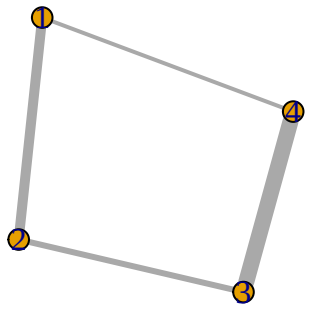
```
#
graph(edges = c(1,2, 2,3, 3,4, 4,1),
          n = 4,
          directed = F) -> g
plot(g)
```




```
#
graph(edges = c(1,2, 2,3, 3,4, 4,1),
          n = 4,
          directed = F) -> g

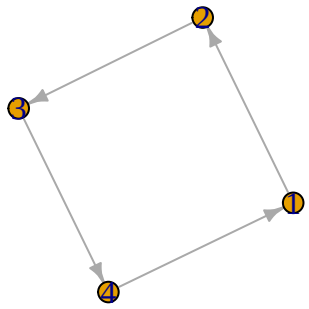
E(g)$weight = c(5,3,8,2) #

plot(g,
     edge.width = E(g)$weight
     )
```




```
#
graph(edges = c(1,2, 2,3, 3,4, 4,1),
          n = 4,
          directed = T) -> g


plot(g,
     edge.arrow.size = 0.5#
     )
```

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graph(edges = c(1,2, 2,3, 3,4, 4,1),
          n = 4,
          directed = T) -> g

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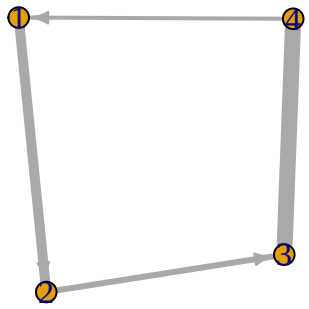
plot(g,
     edge.arrow.size = 0.5,#
     edge.width = E(g)$weight
     )
```



The history of network is short. Here is the figure of network history:

1.1.3

$X{i}, i 1 $ Y , X_1 Y

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1.2.1

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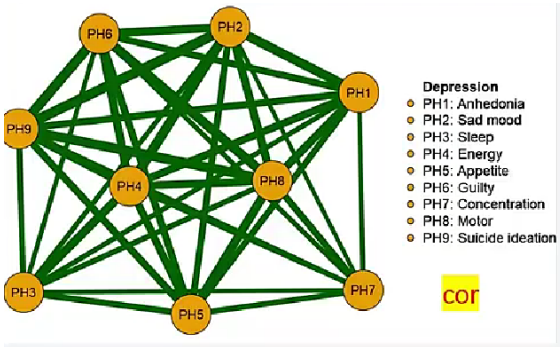

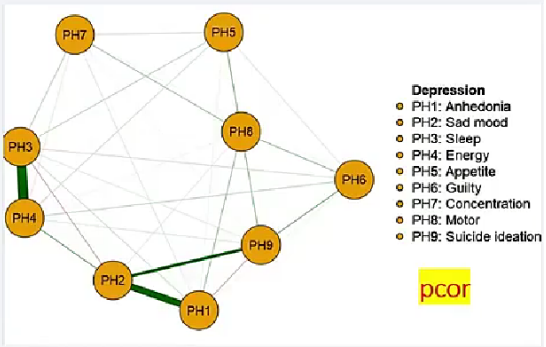

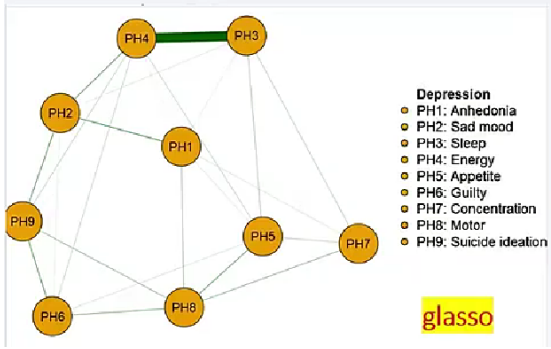

- 不同**算法**的结果是略有差别的，所以要在方法部分写清楚自己的算法

: - -> (qgraph package) - -> (Ising model)(IsingFit package) , - + -> (mgm package)

2. :

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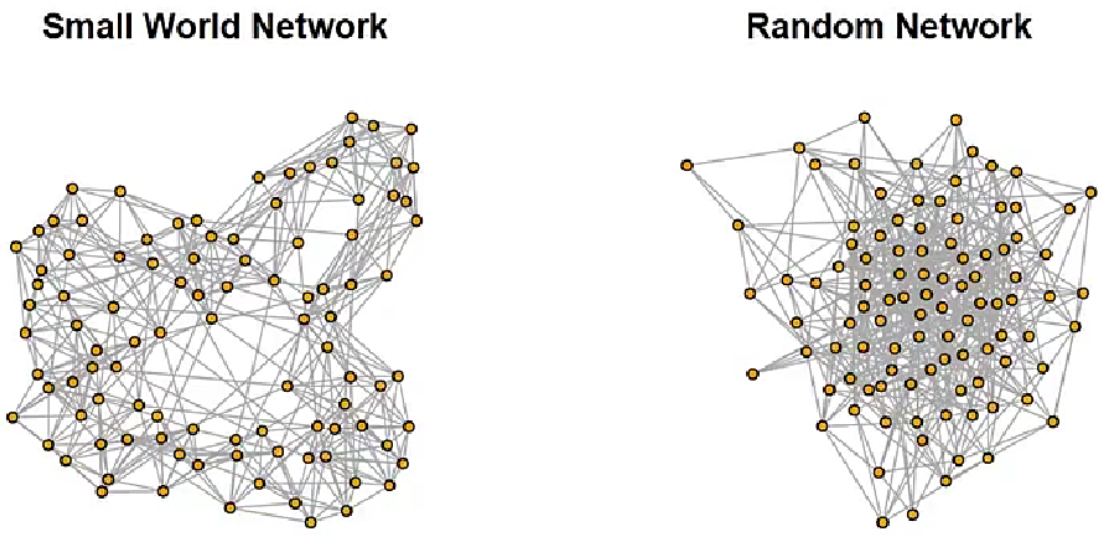
- : .



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2. : ,

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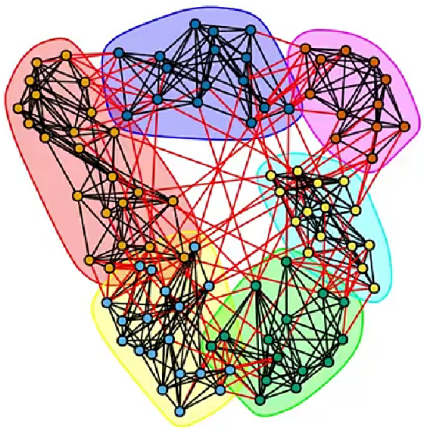


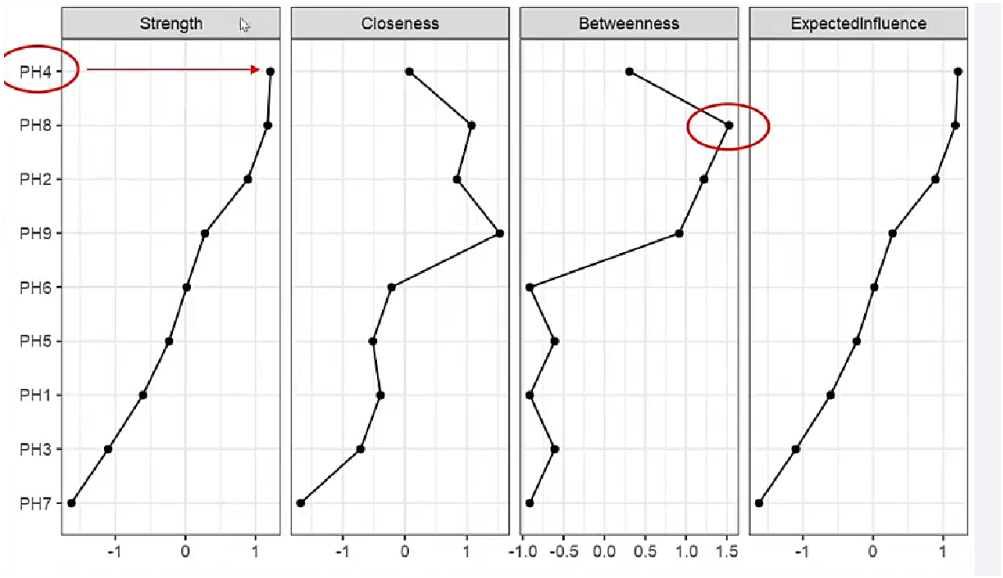
1. 使用社区检测算法识别社区

2. 计算模块度，比较模块度值，判断社区结构是否良好

- **模块度（Modularity）**：**衡量社区结构质量**的指标。值越**高**，表示社区**划分越显著**。
- **0.3及以上**：一般认为社区结构良好。
- **低于0.3**：表示社区结构一般，可能需要重新调整或选择其他算法。

3. 绘制社区检测结果

2. : . : , , .



3. :

Bootstrapping

-
-

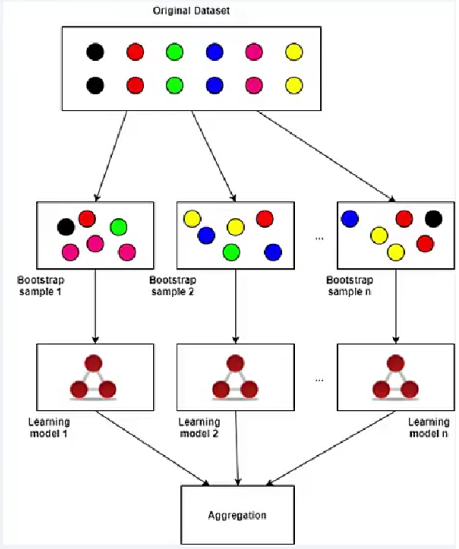
具体步骤如下：

1. 随机抽样：从原始数据集中随机抽样，生成多个新的样本集。

2. 重构网络：对每个新的样本集，重新构建网络并计算边权重和中心性指标。

3. 估计分布：通过这些重新构建的网络，估计边权重和中心性指标的分布。

4. 计算置信区间：根据估计的分布，计算边权重和中心性指标的置信区间。



4.

2 LaTex

2.1 LaTeX

2.1.1 1.

α	`\alpha`	A	`A`
β	`\beta`	B	`B`
γ	`\gamma`	Γ	`\Gamma`
θ	`\theta`	Θ	`\Theta`
π	`\pi`	Π	`\Pi`

2.1.2 2.

$x \pm y$	`x \pm y`	$x \times y$	`x \times y`
$x \div y$	`x \div y`	$x \cdot y$	`x \cdot y`
$x \neq y$	`x \neq y`	$x \approx y$	`x \approx y`
$x \geq y$	`x \geq y`	$x \leq y$	`x \leq y`

2.1.3 3.

x^2	`x^2`
x_1	`x_1`
$\frac{a}{b}$	`\frac{a}{b}`
$\sqrt{x}$	`\sqrt{x}`
$\sqrt[n]{x}$	`\sqrt[n]{x}`

2.1.4 4.

$\frac{df}{dx}$	`\frac{df}{dx}`
$\frac{\partial f}{\partial x}$	`\frac{\partial f}{\partial x}`
$\int_a^b f(x)dx$	`\int_a^b f(x)dx`
$\lim_{x \to 0} f(x)$	`\lim_{x \to 0} f(x)`
$\sum_{i=1}^{n} x_i$	`\sum_{i=1}^n x_i`

2.1.5 5.

$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$	`\begin{bmatrix} a & b \\ c & d \end{bmatrix}`
$\vec{v}$	`\vec{v}`
$\mathbf{a} \cdot \mathbf{b}$	`\mathbf{a} \cdot \mathbf{b}`

2.1.6 6.

$x \in A$	`x \in A`	$A \subset B$	`A \subset B`
$A \cup B$	`A \cup B`	$A \cap B$	`A \cap B`
$\forall x$	`\forall x`	$\exists x$	`\exists x`

2.1.7 7.

$x \to y$	`x \to y`	$f : X \to Y$	`f: X \to Y`
$\left(\frac{a}{b}\right)$	`\left( \frac{a}{b} \right)`	$\|x\|$	`|x|`

2.1.8 8.

∞	\infty	∇	\nabla
∂	\partial	...	\dots

3 GitHub

3.0.1 Resubmit Content

resubmit content: step1: type `git status` in terminal next to console,

Step 1: Check Git Status

- Open the terminal and type:

  ```
  git status
  ```

  This will show the current state of your files.

Step 2: Commit Changes

- If there are changes to submit, run:

  ```
  git commit -m "Initial commit"
  ```

Step 3: Connect to GitHub

- To create a new GitHub repository, run in R (if using `usethis`):

  ```
  usethis::use_github()
  ```

  This will set up a new repository.

Step 4: Push to GitHub (If Repository Exists)

- If you already have a GitHub repository, you can push your project directly:
  - **Option 1:** Use the **"Push"** button in the top-right corner of RStudio.
  - **Option 2:** Run in the terminal:

    ```
    git push origin main
    ```

Step 5: Set Up GitHub Pages

- After pushing, go to your GitHub repository:
  - **Settings** → **Pages** → Select the branch (e.g., `main` or `gh-pages`) and save.

4

1. (reference) , render book
2. github token , DNS .

5 Prompts :

Research writing: Please refine the translation of [text] from Chinese to English, ensuring that it is precise, scholarly, and aligns with the professional standards of psychology, psychiatry, or public health. The translation should remain faithful to the original meaning, avoiding unnecessary condensation, and the language should be fluent, stylistically appropriate, and meet the high standards of academic writing. Pay special attention to consistency in terminology, and, when necessary, consider the cultural context to ensure the translation is suitable for the target academic audience.

6 Summary

In summary, this book has no content whatsoever.

```
1 + 1
```

```
[1] 2
```

References