



Matemática computacional

Análise estatística e espectral dos dados do COVID-19

15 de Junho de 2020

São José dos Campos - SP

Fernando Cossetin

Felipe Menino

Felipe Perin

Objetivo

Caracterizar as séries temporais dos países e regiões designados ao grupo

Conjunto de dados

- Time azul
- Responsável por Brasil, Canadá, Rússia, Cuba e México;
- São considerados também o estado de Minas Gerais e a município de Niterói.

Aquisição de dados

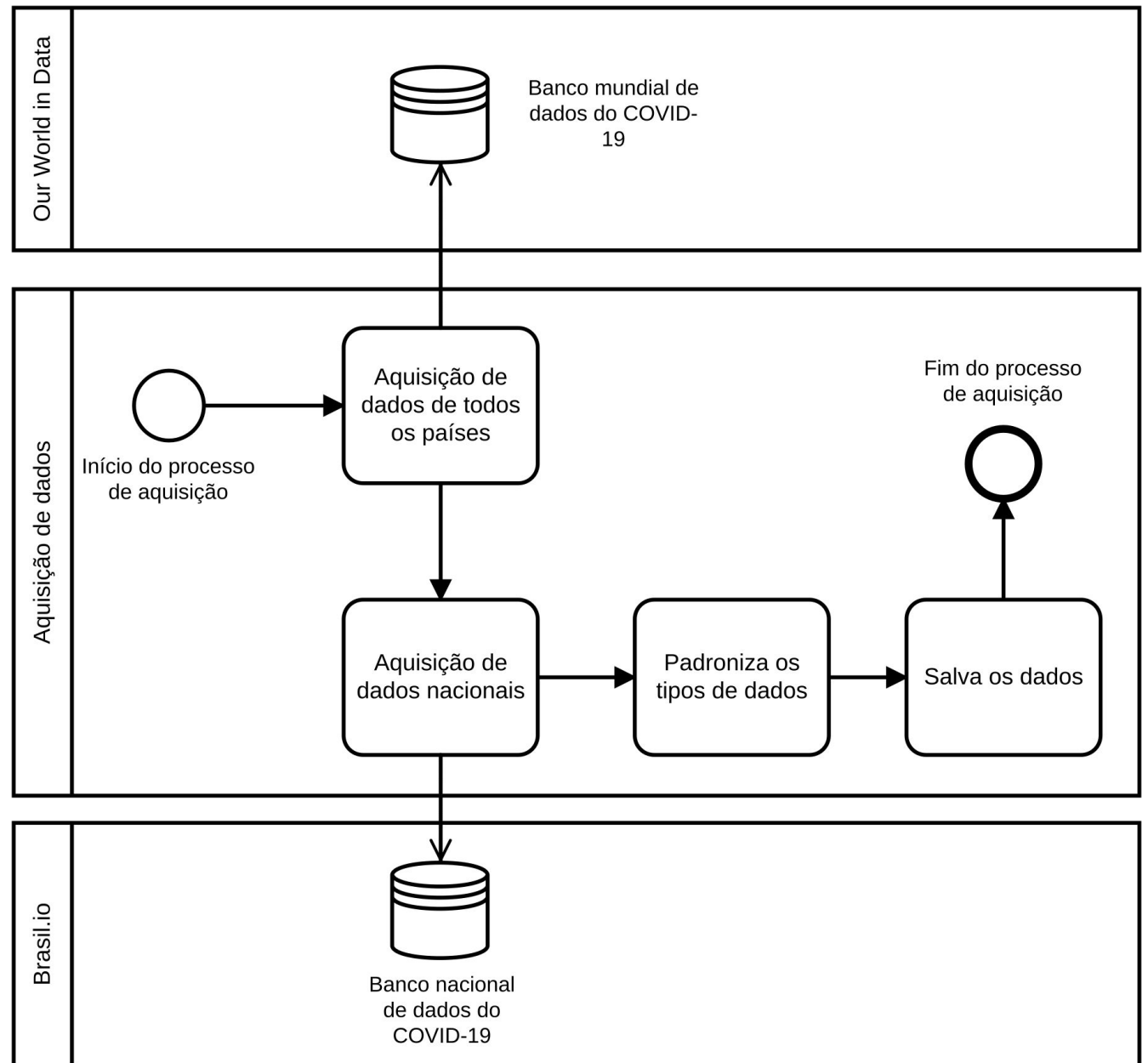
Dados Nacionais



Dados internacionais



Dados coletados até 03/06/2020



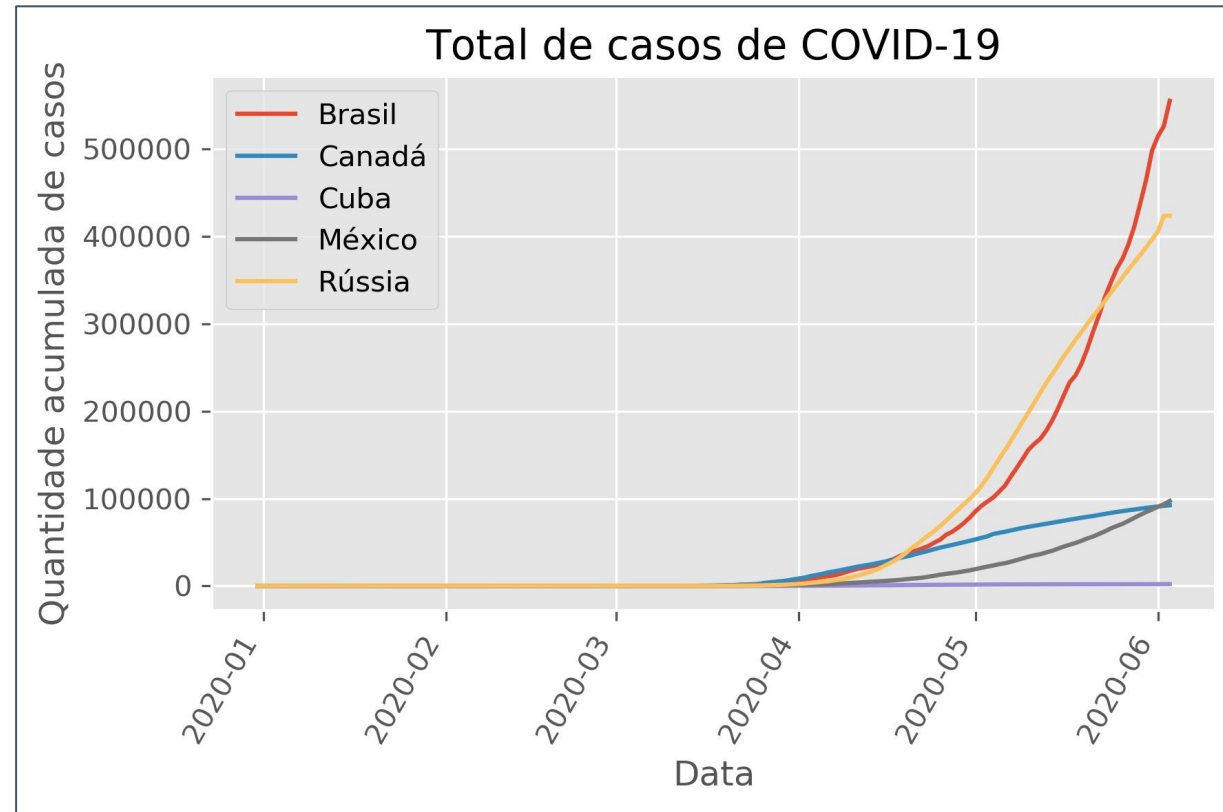
Tratamento dos dados

- Padronização dos tipos de datas;
- Filtro para as variáveis de interesse;
- Redução da quantidade de dias antes dos primeiros registros de infectados.

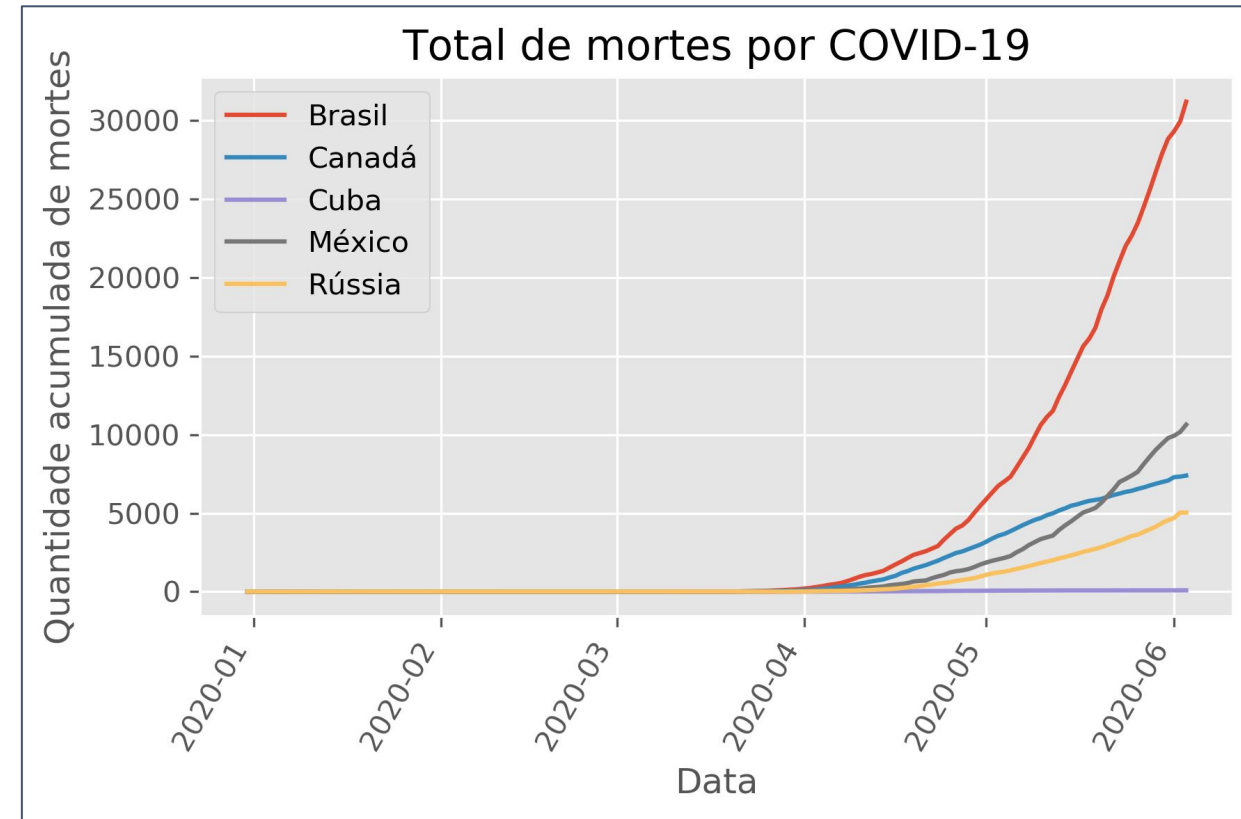
Caracterização das séries temporais (Internacionais)

Número total de casos e mortes

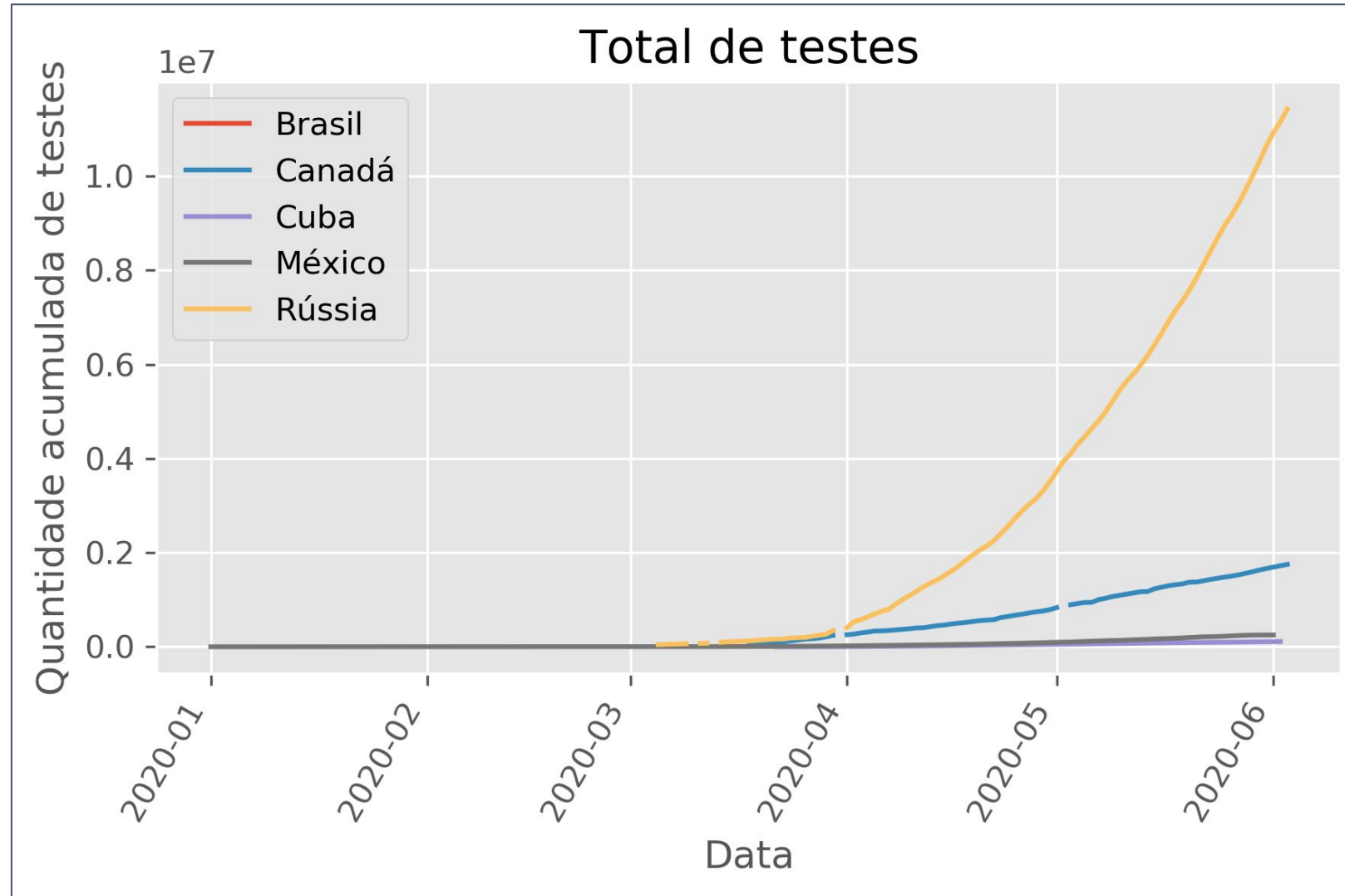
Total de casos de COVID-19



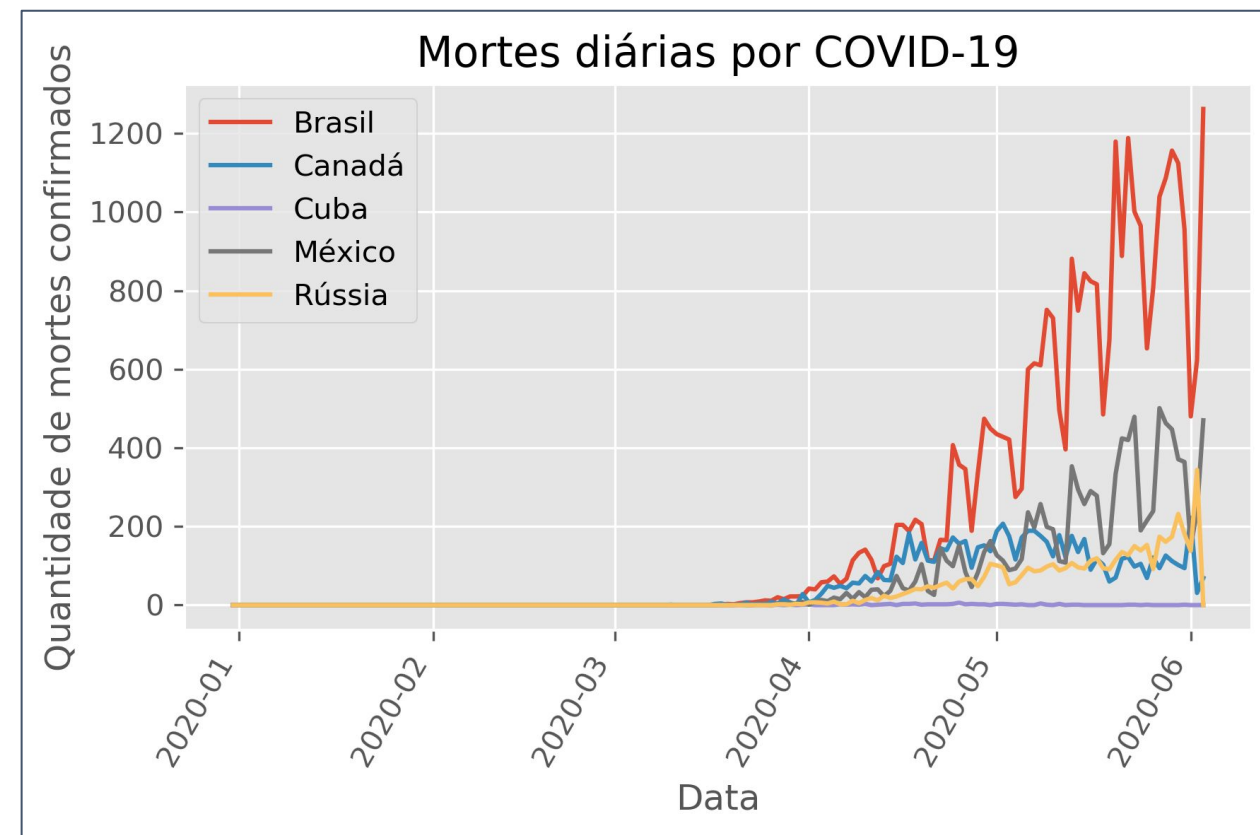
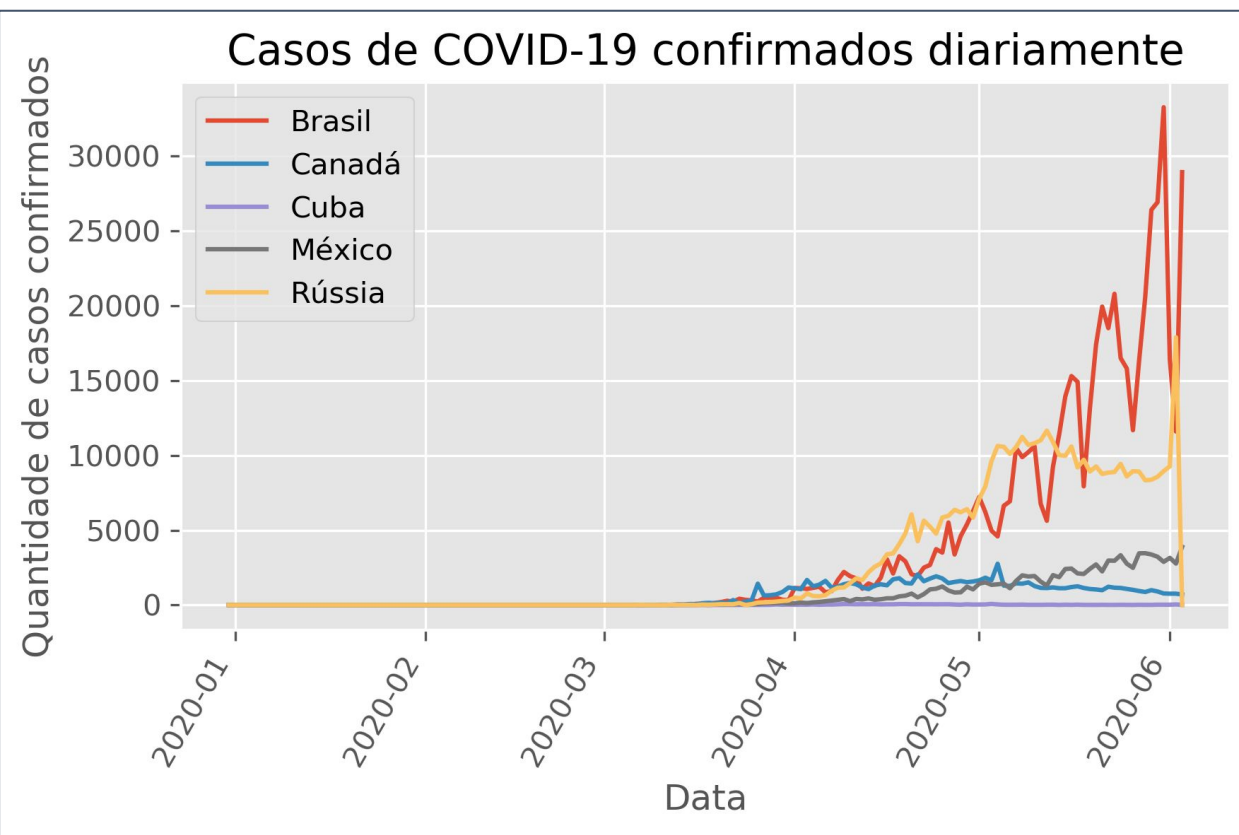
Total de mortes por COVID-19



Número total de testes



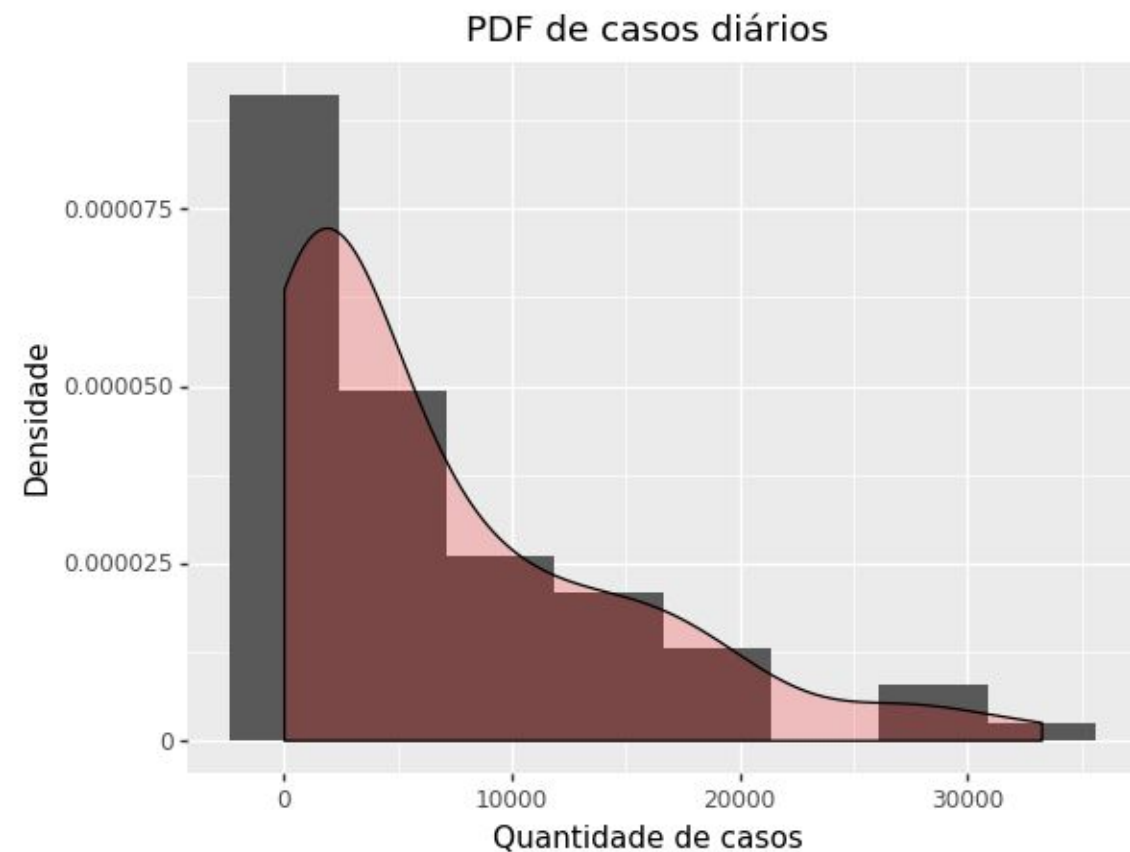
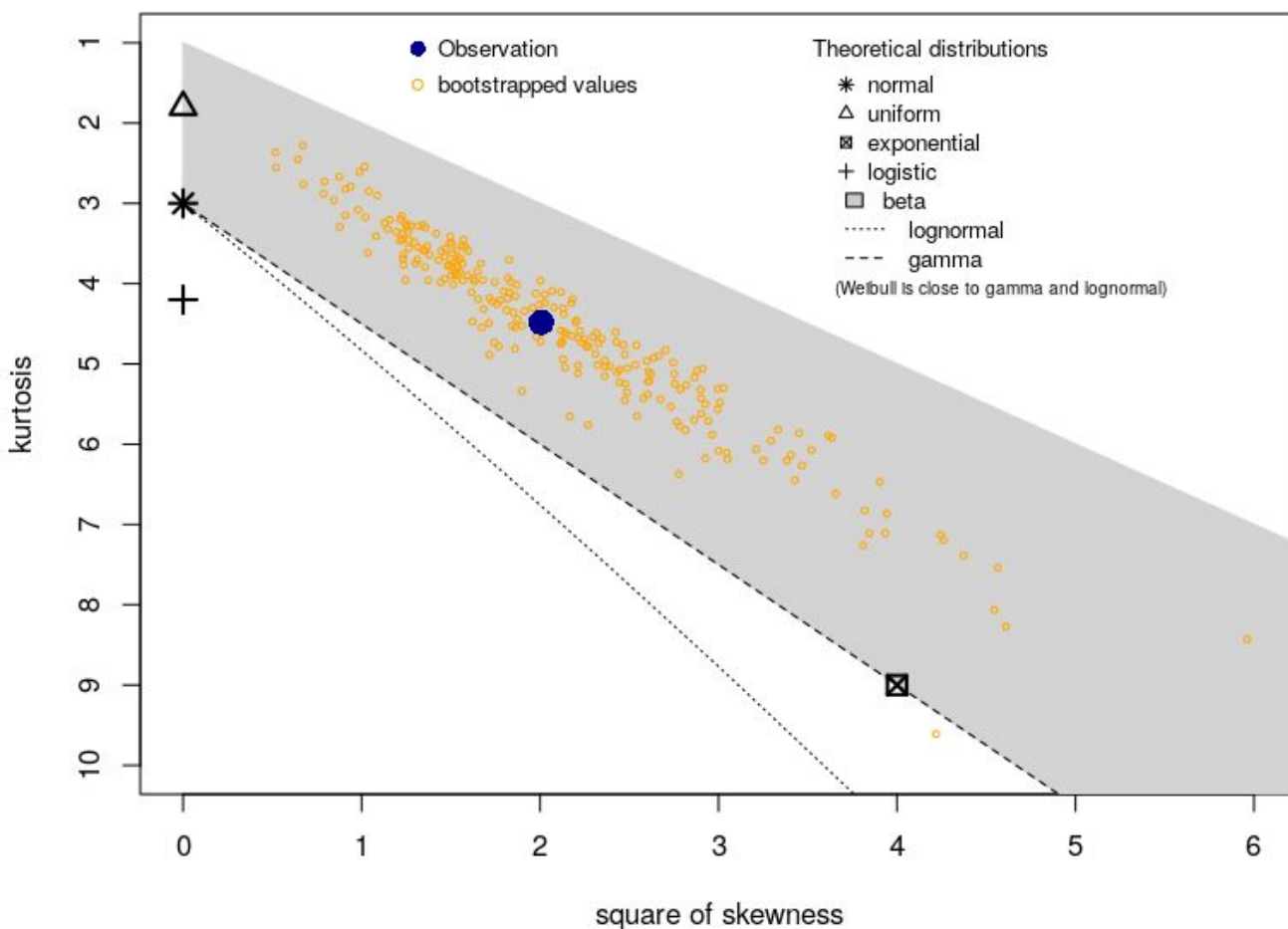
Quantidades diárias



Há alguma similaridade nessas séries ?

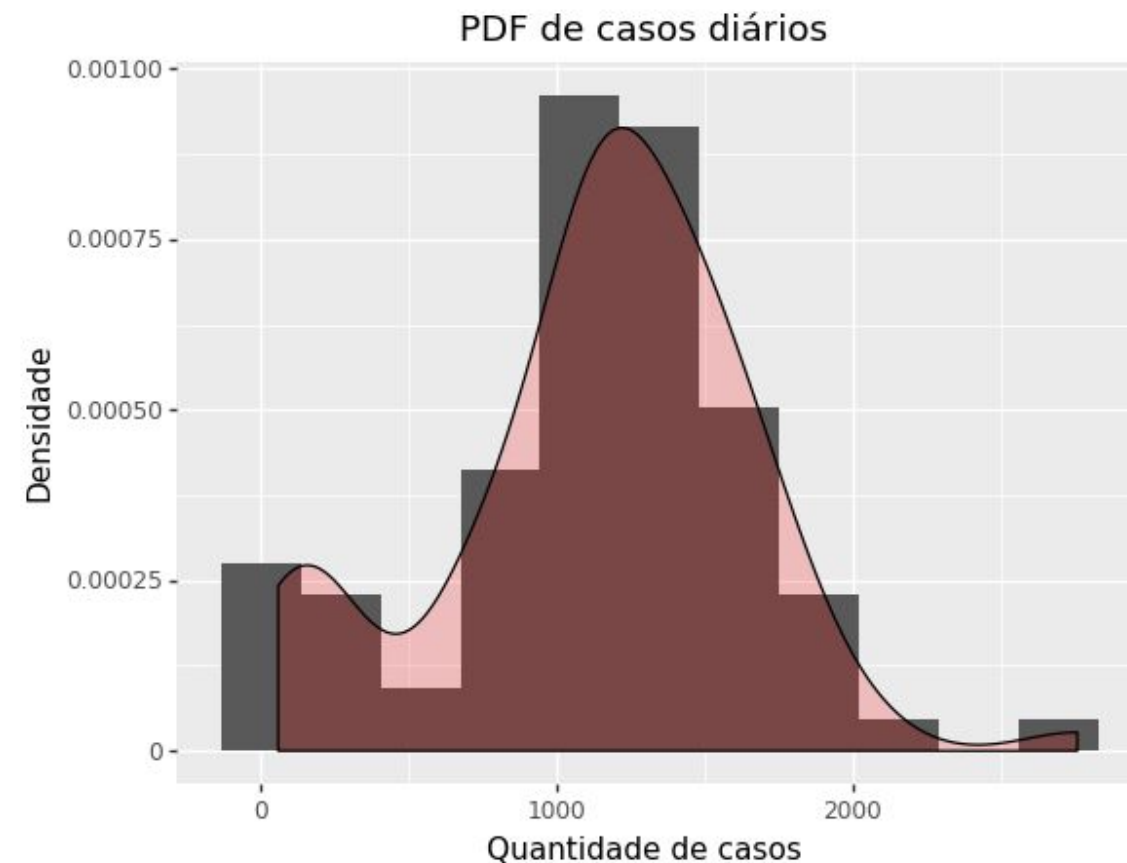
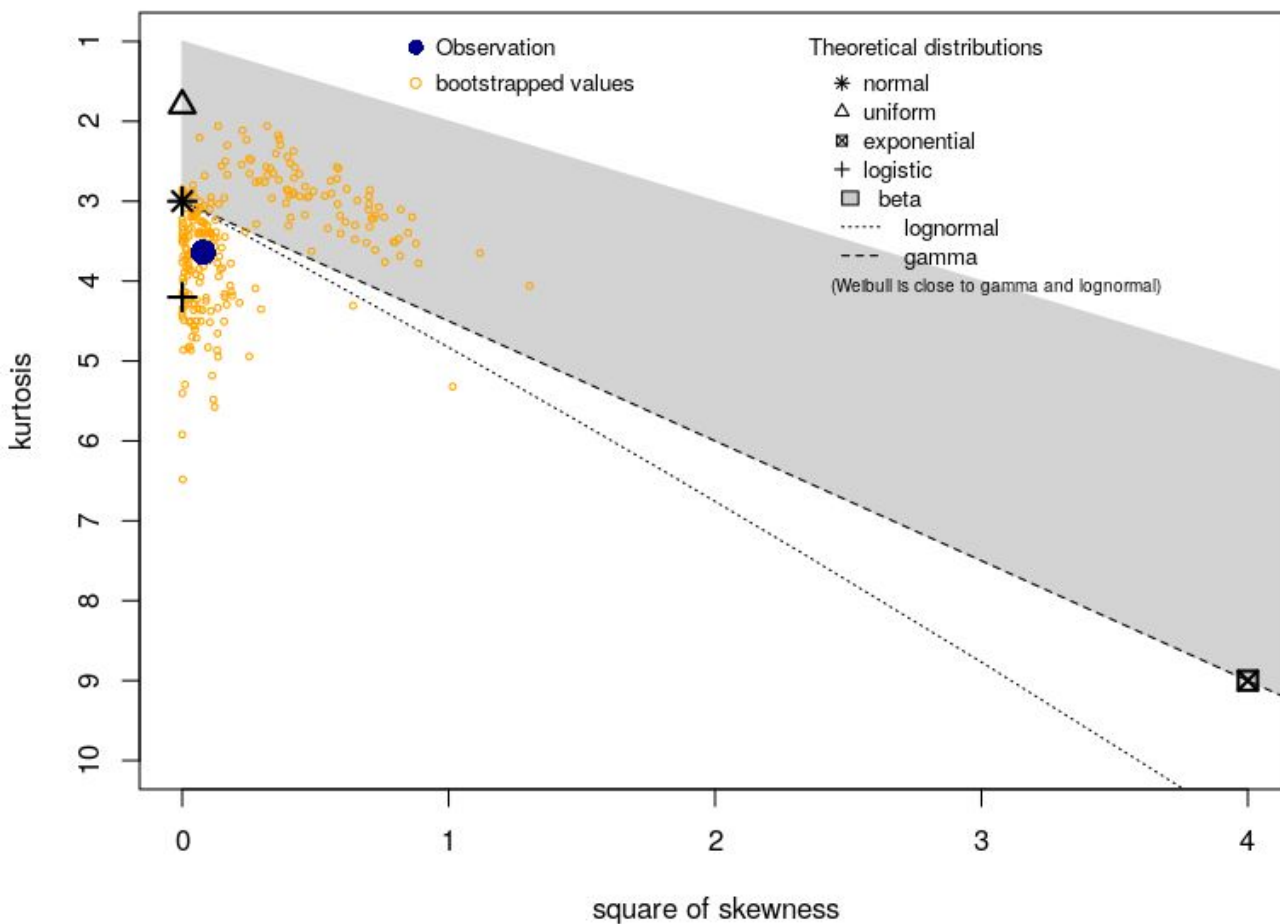
Espaço de Cullen-Frey e PDF

Quantidade diária de casos - Brasil



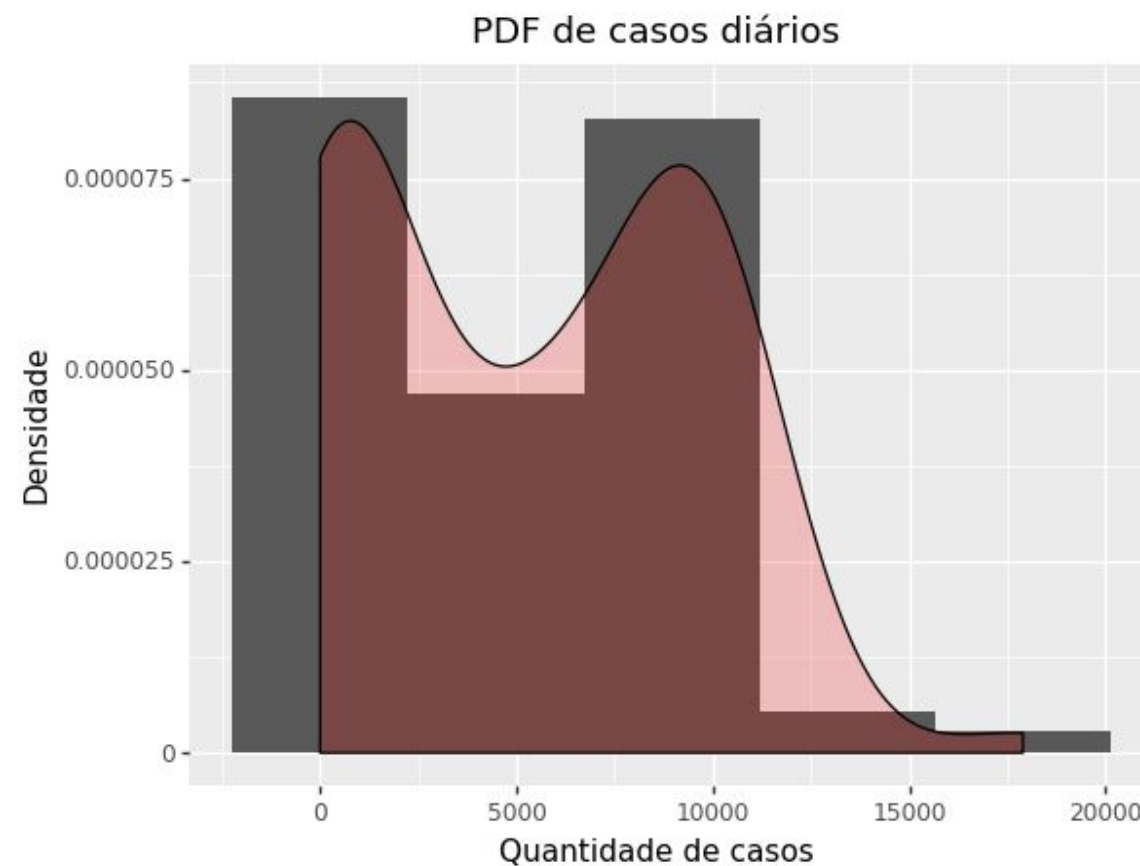
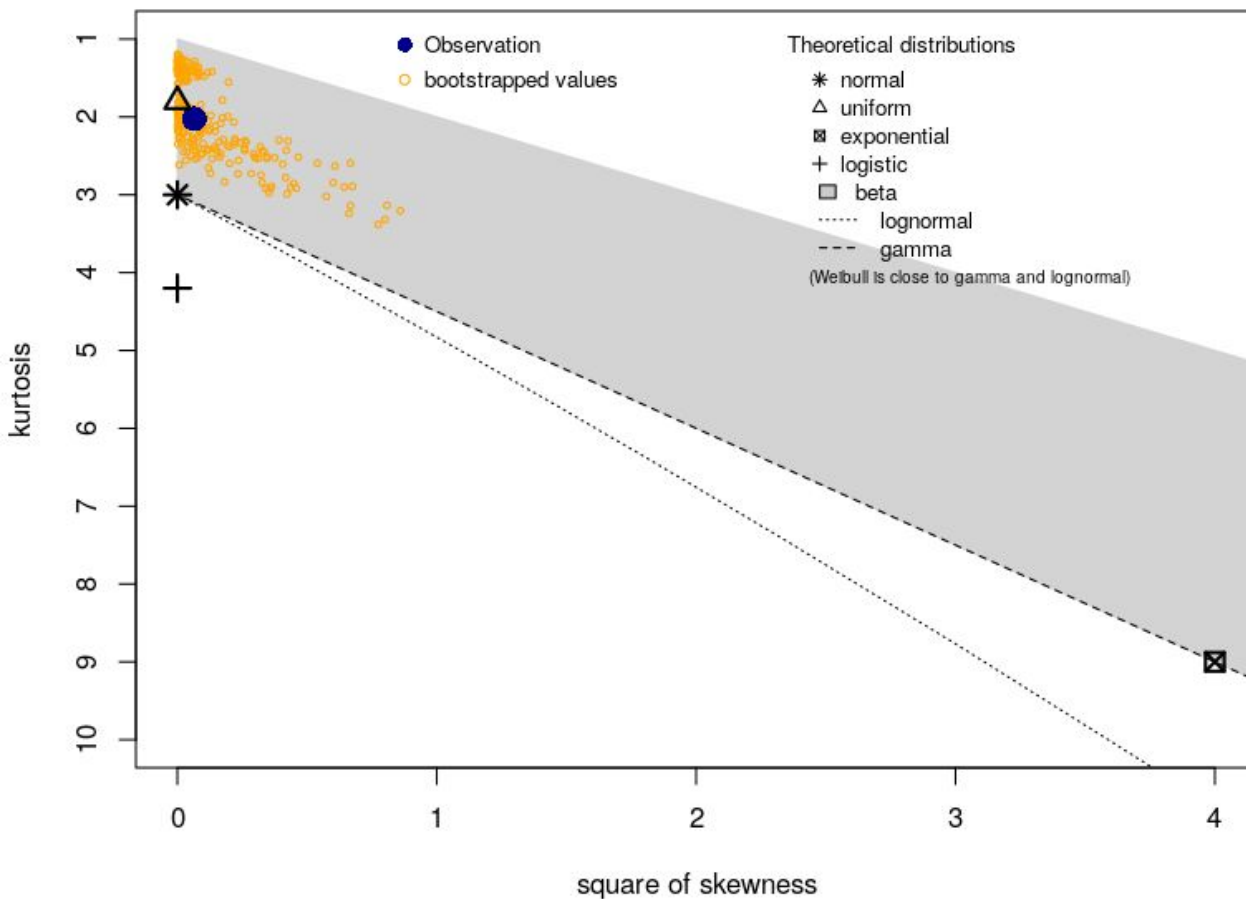
Espaço de Cullen-Frey e PDF

Quantidade diária de casos - Canadá



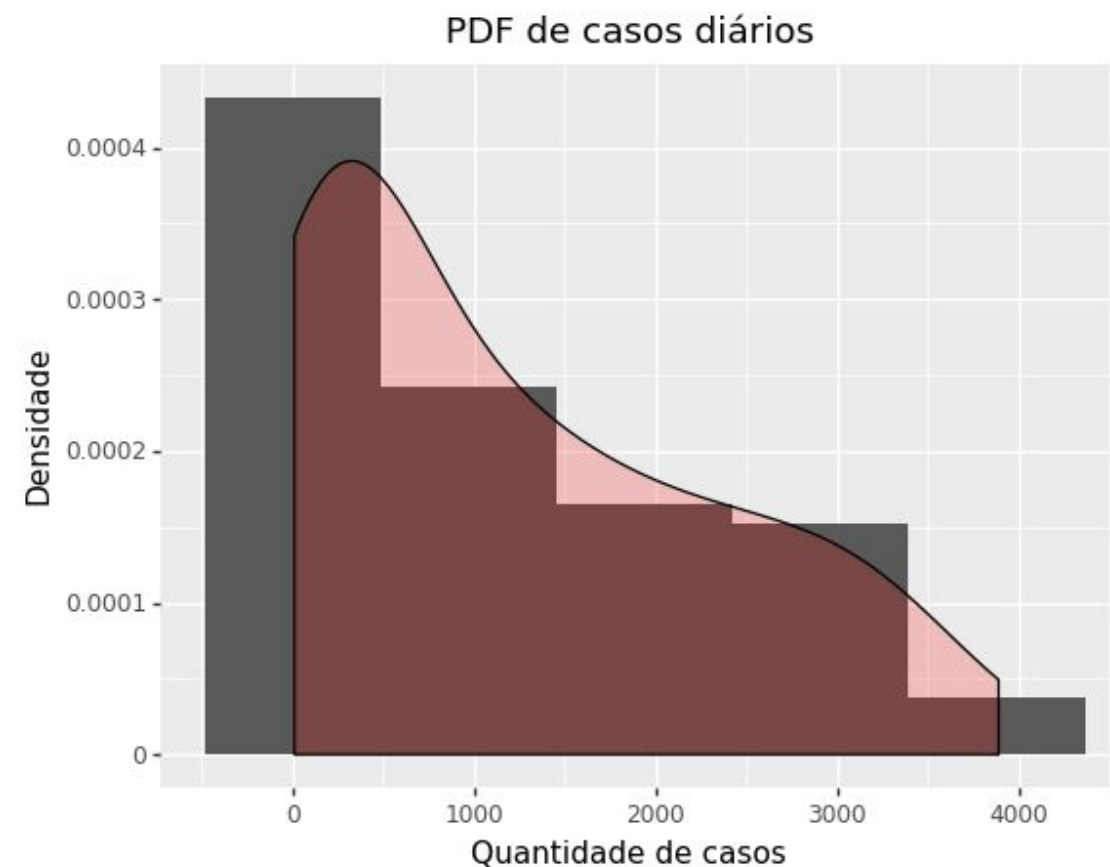
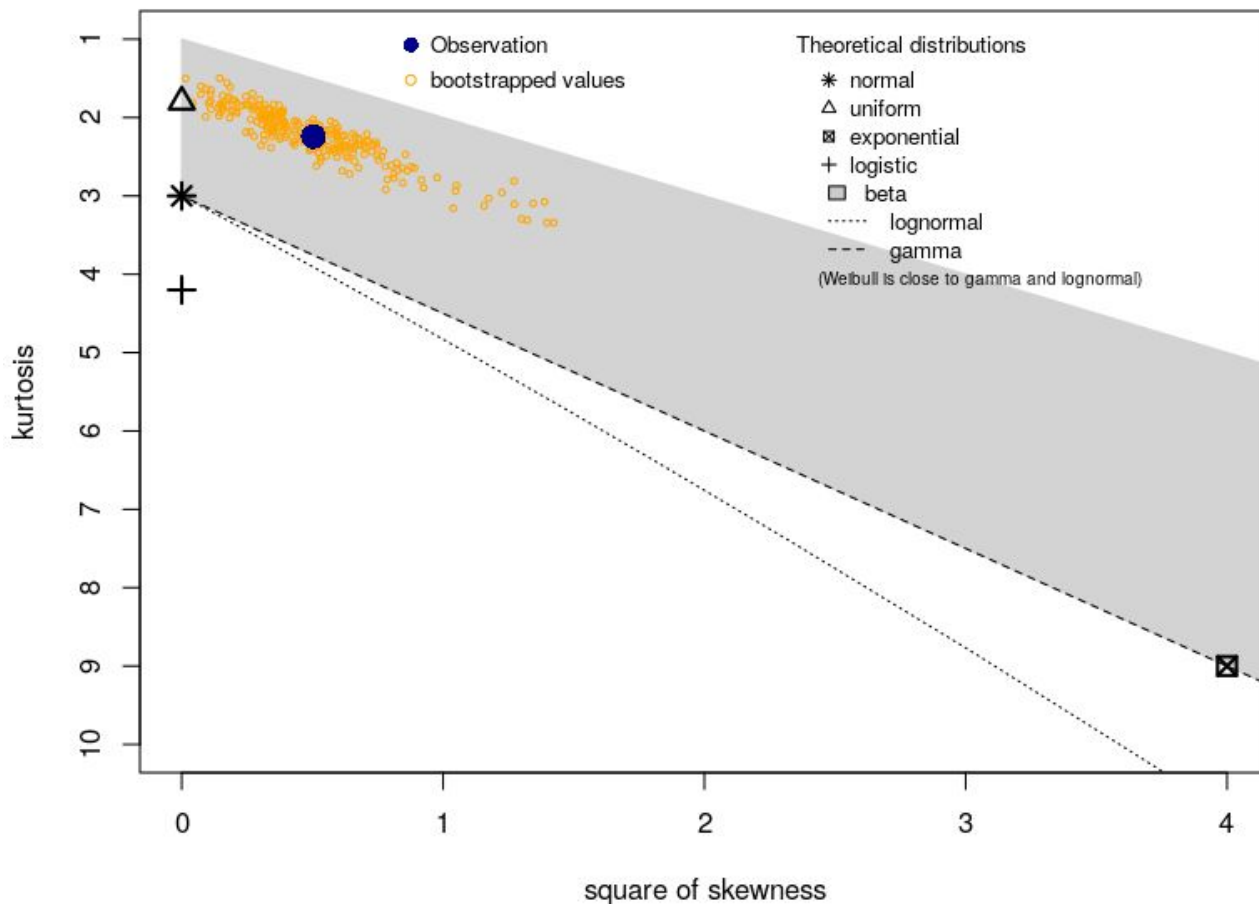
Espaço de Cullen-Frey e PDF

Quantidade diária de casos - Rússia



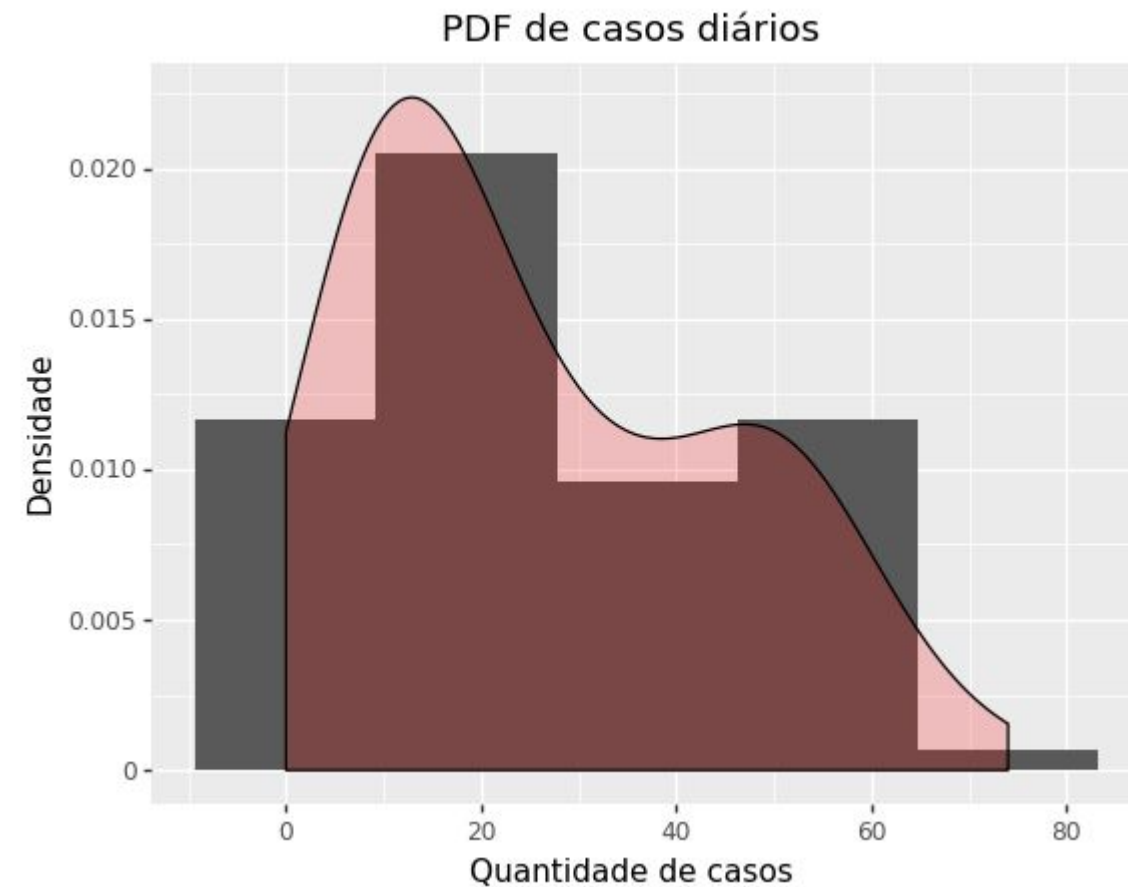
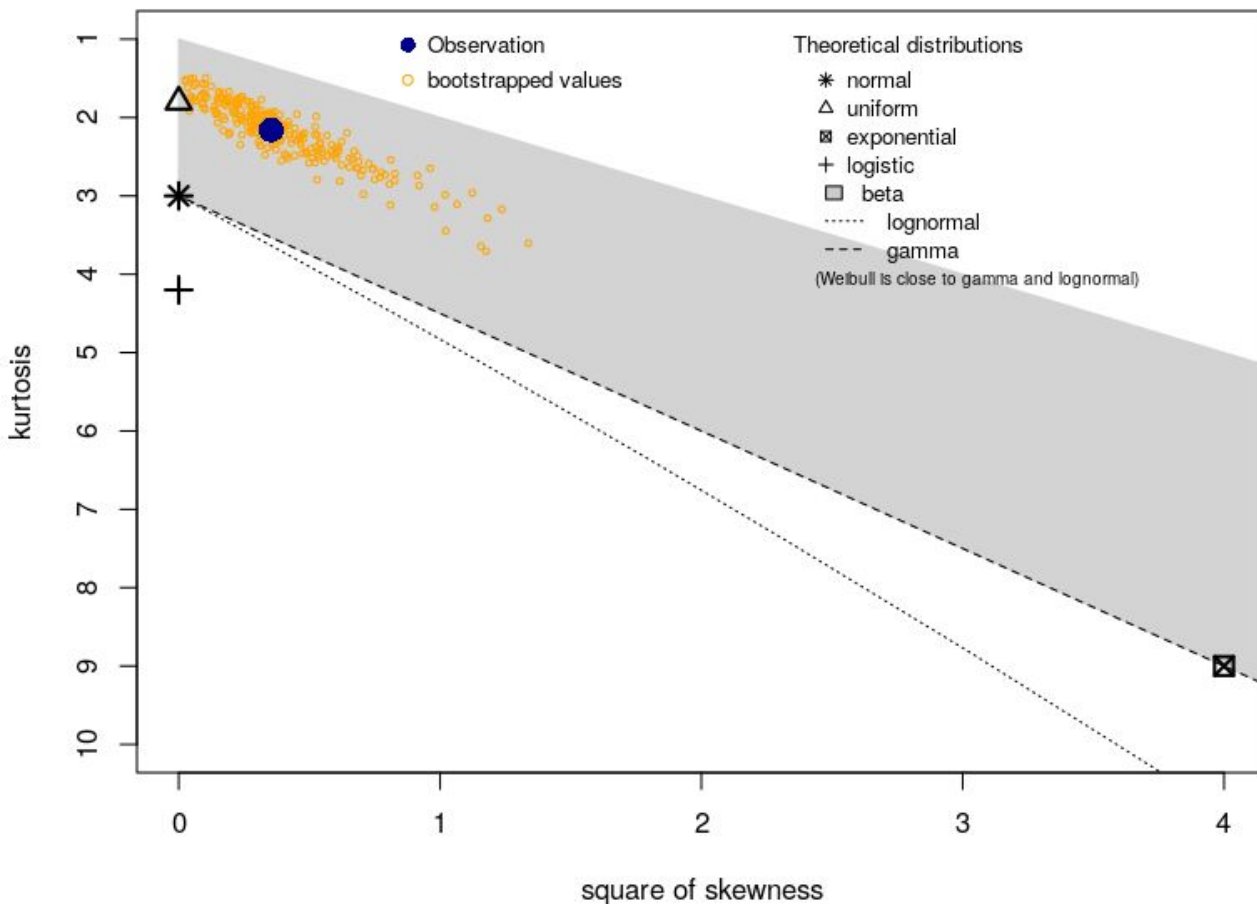
Espaço de Cullen-Frey e PDF

Quantidade diária de casos - México

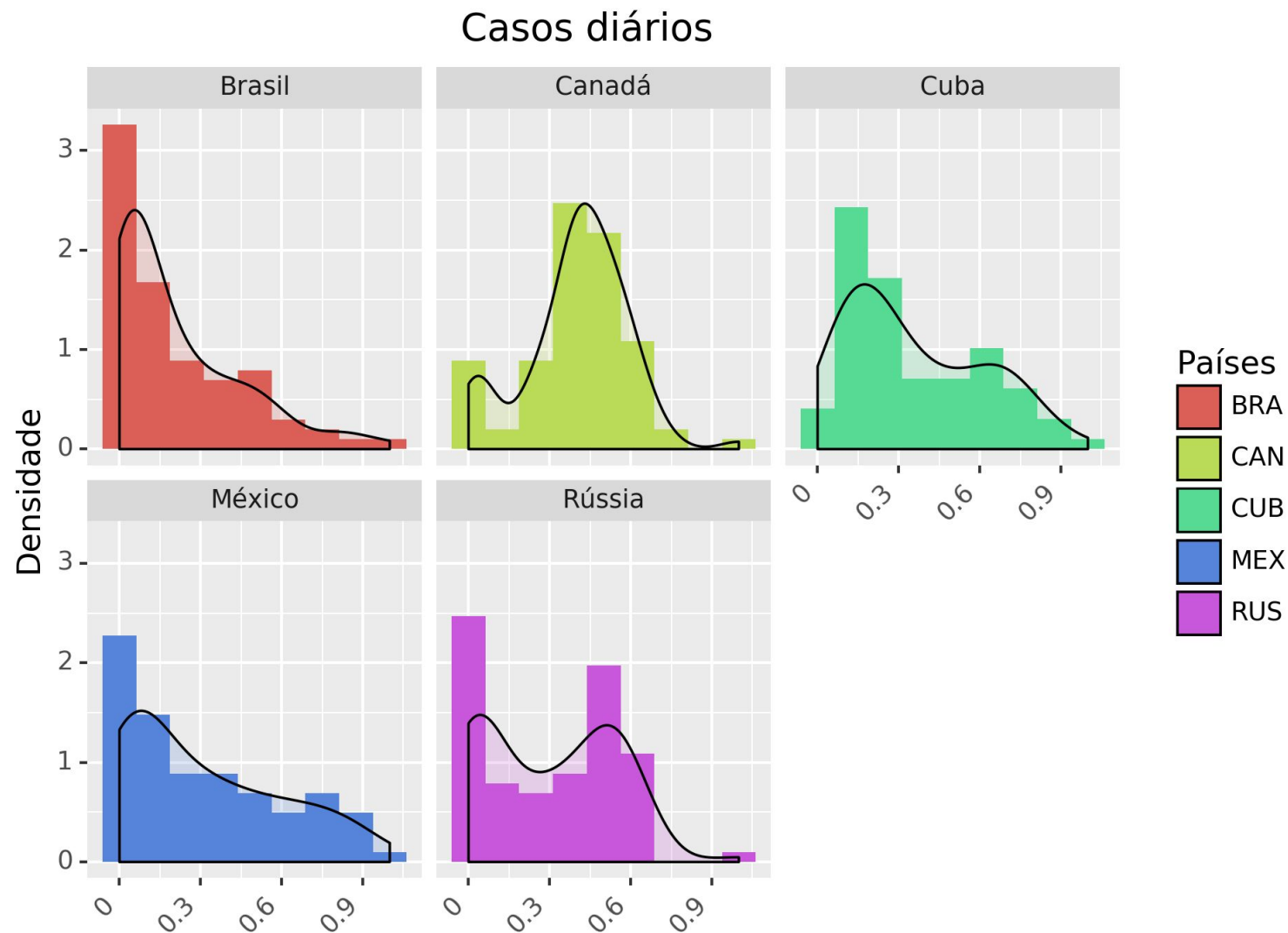


Espaço de Cullen-Frey e PDF

Quantidade diária de casos - Cuba

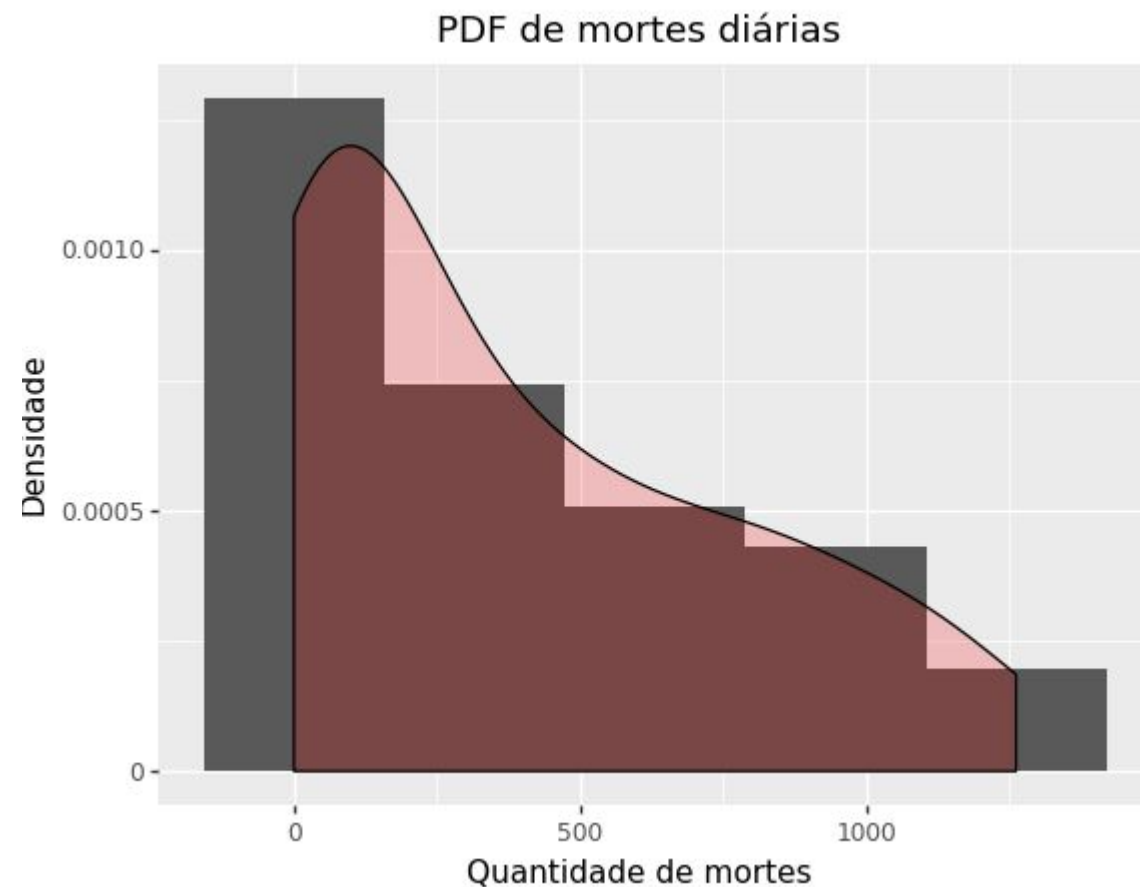
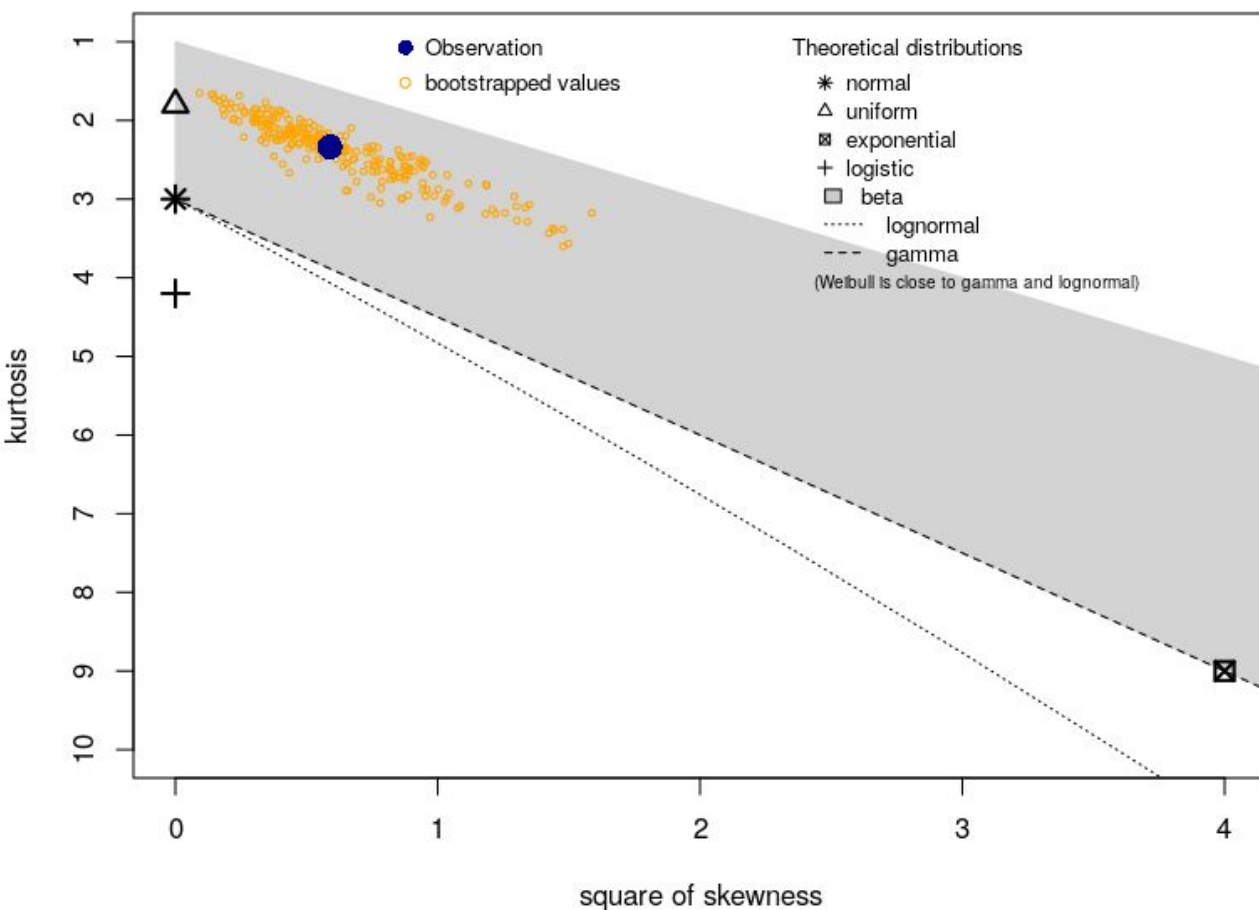


Espaço de Cullen-Frey e PDF



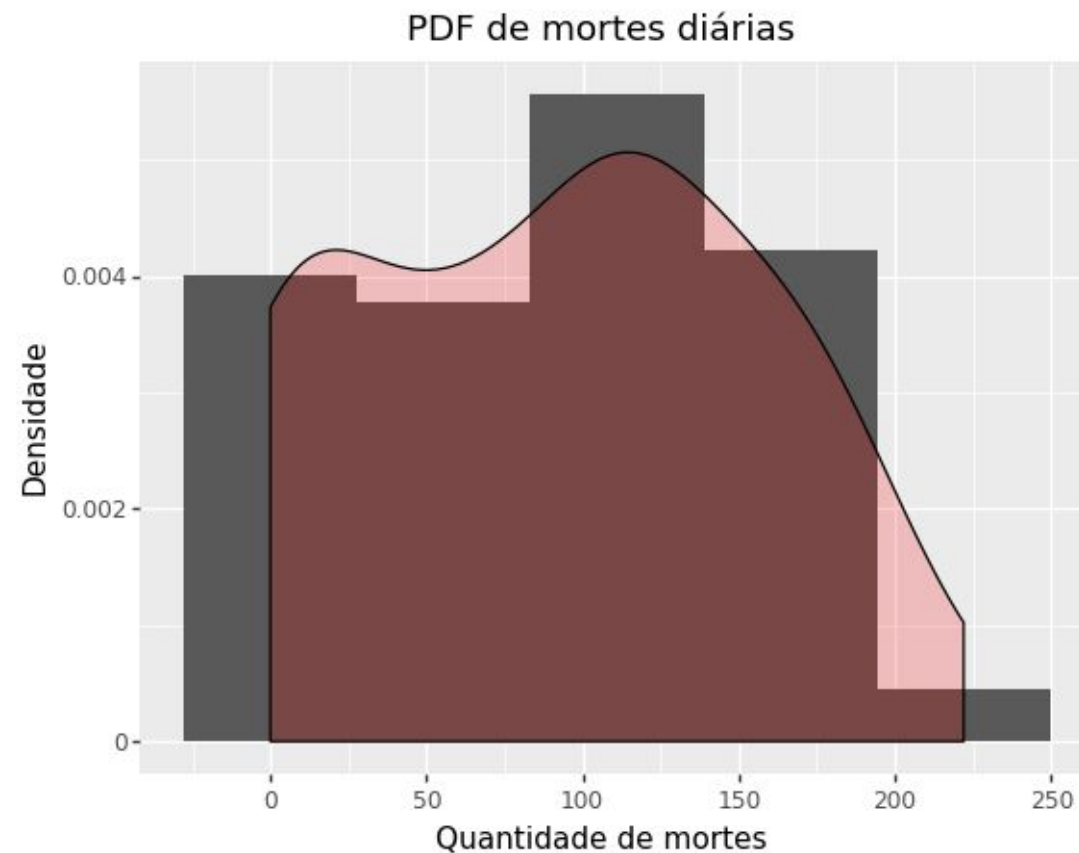
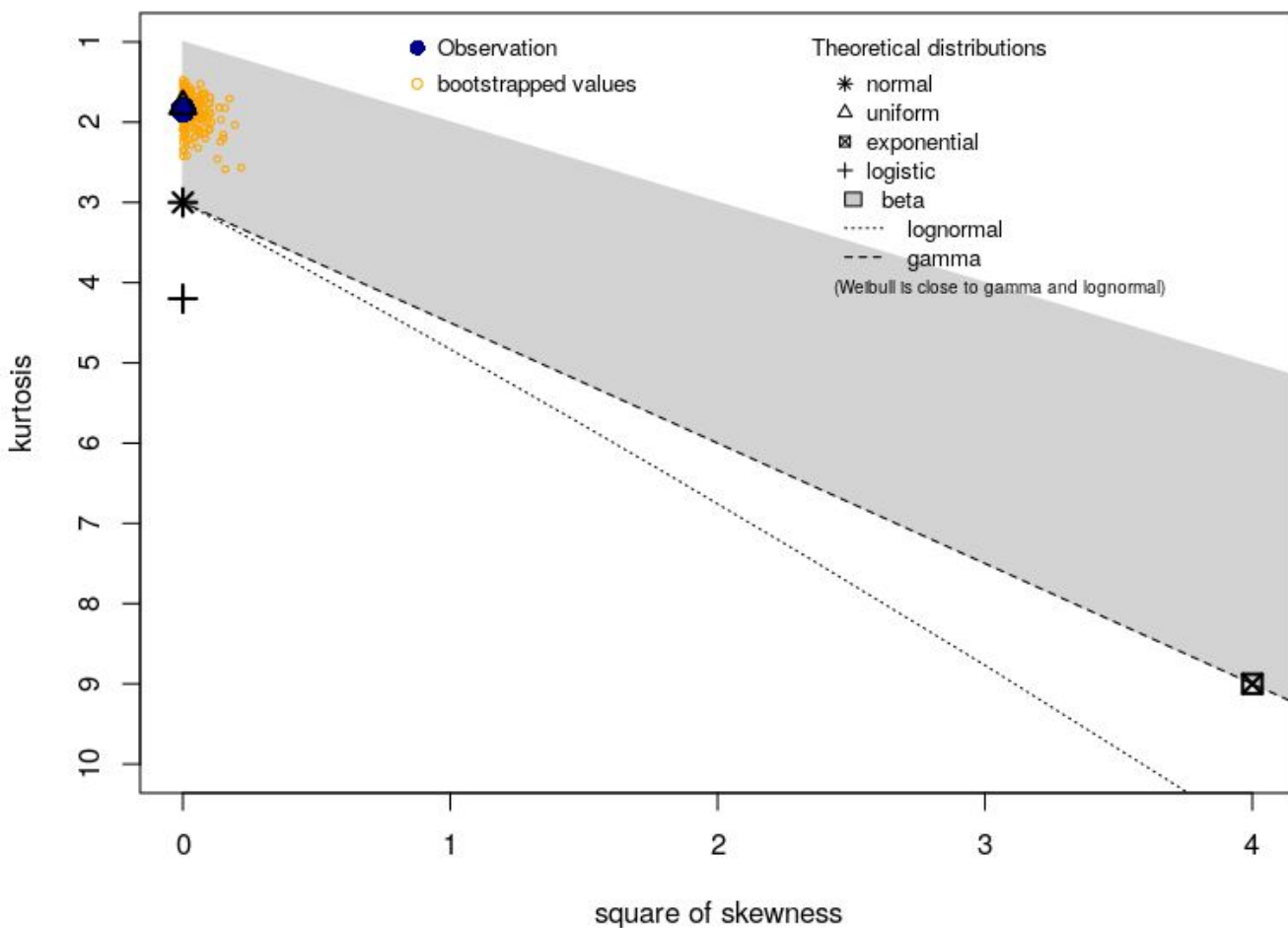
Espaço de Cullen-Frey e PDF

Quantidade diária de mortes - Brasil



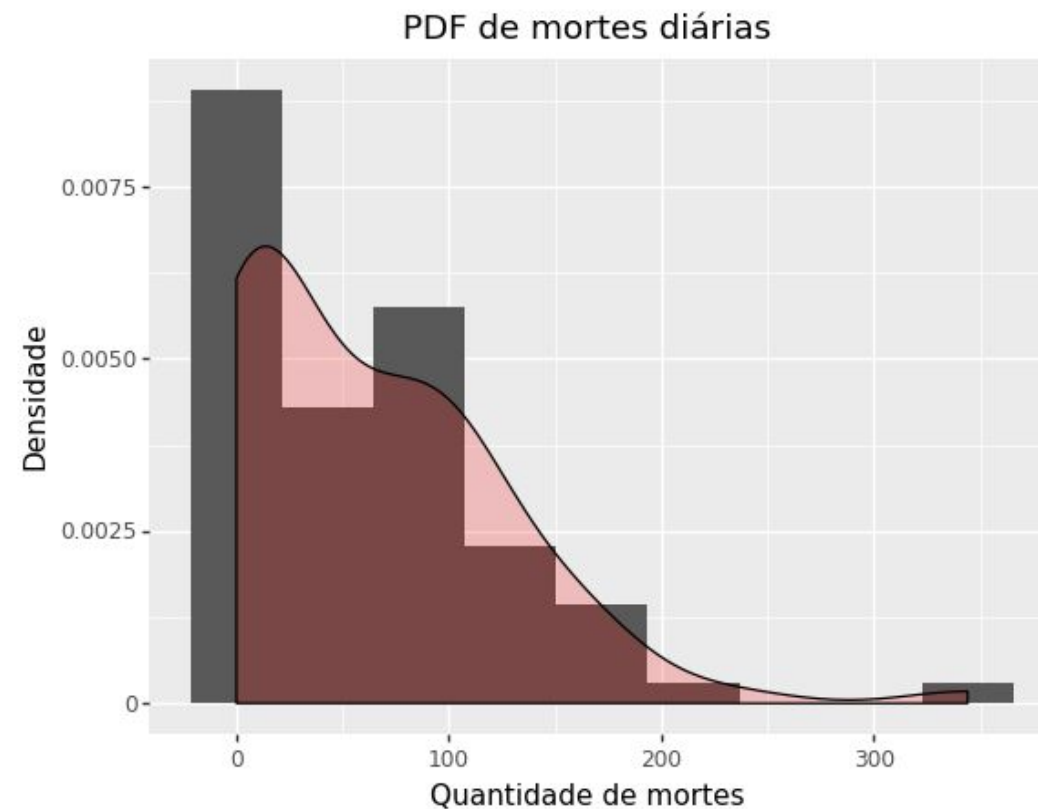
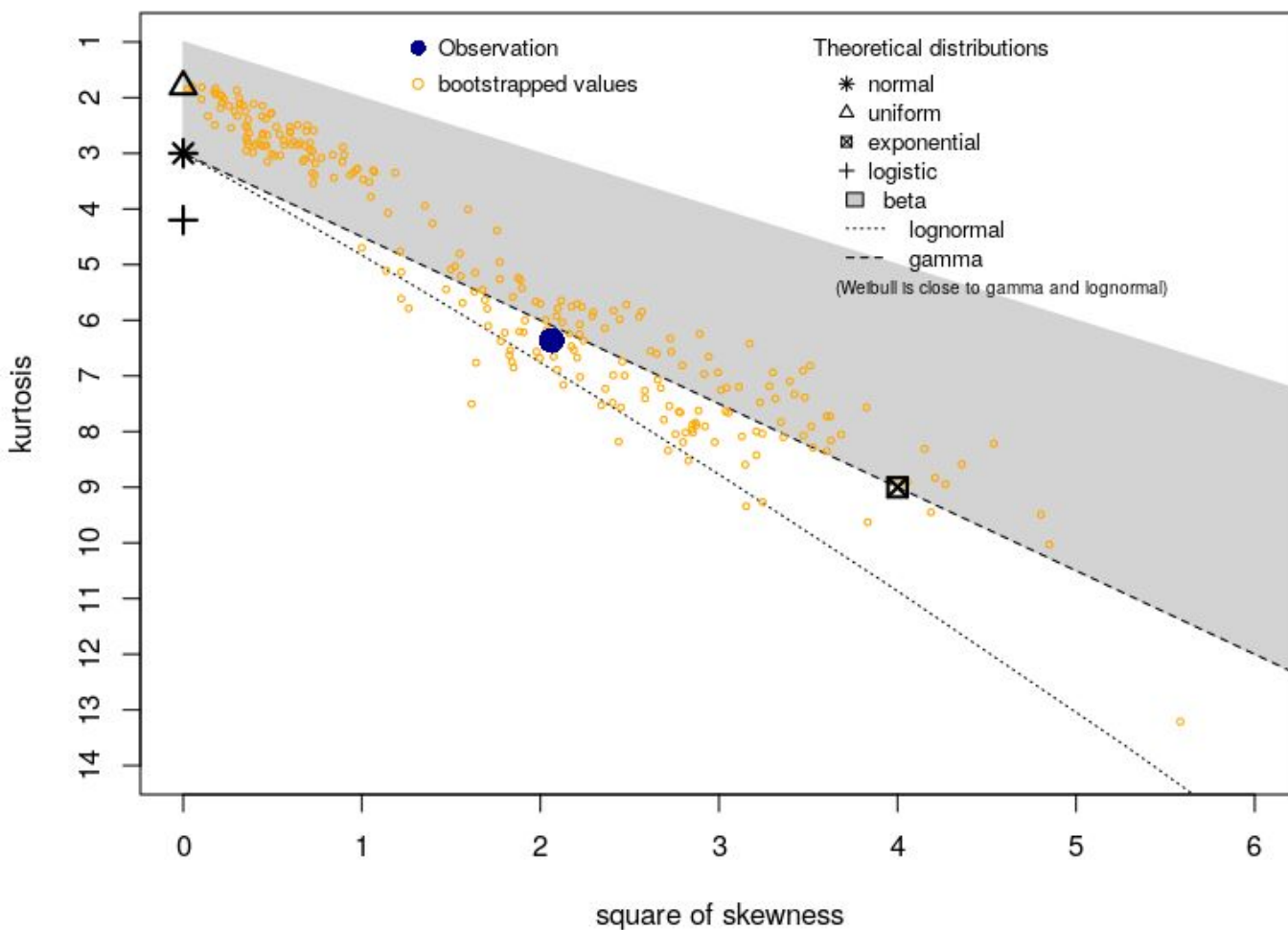
Espaço de Cullen-Frey e PDF

Quantidade diária de mortes - Canadá



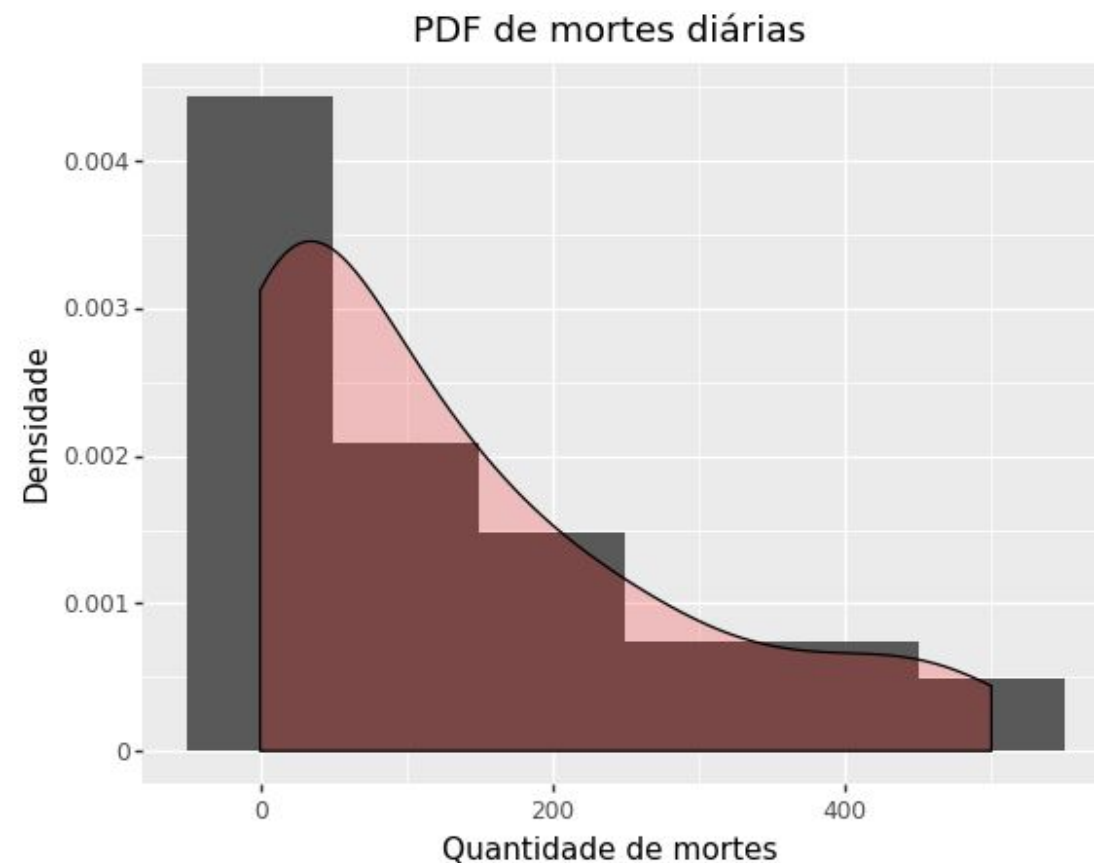
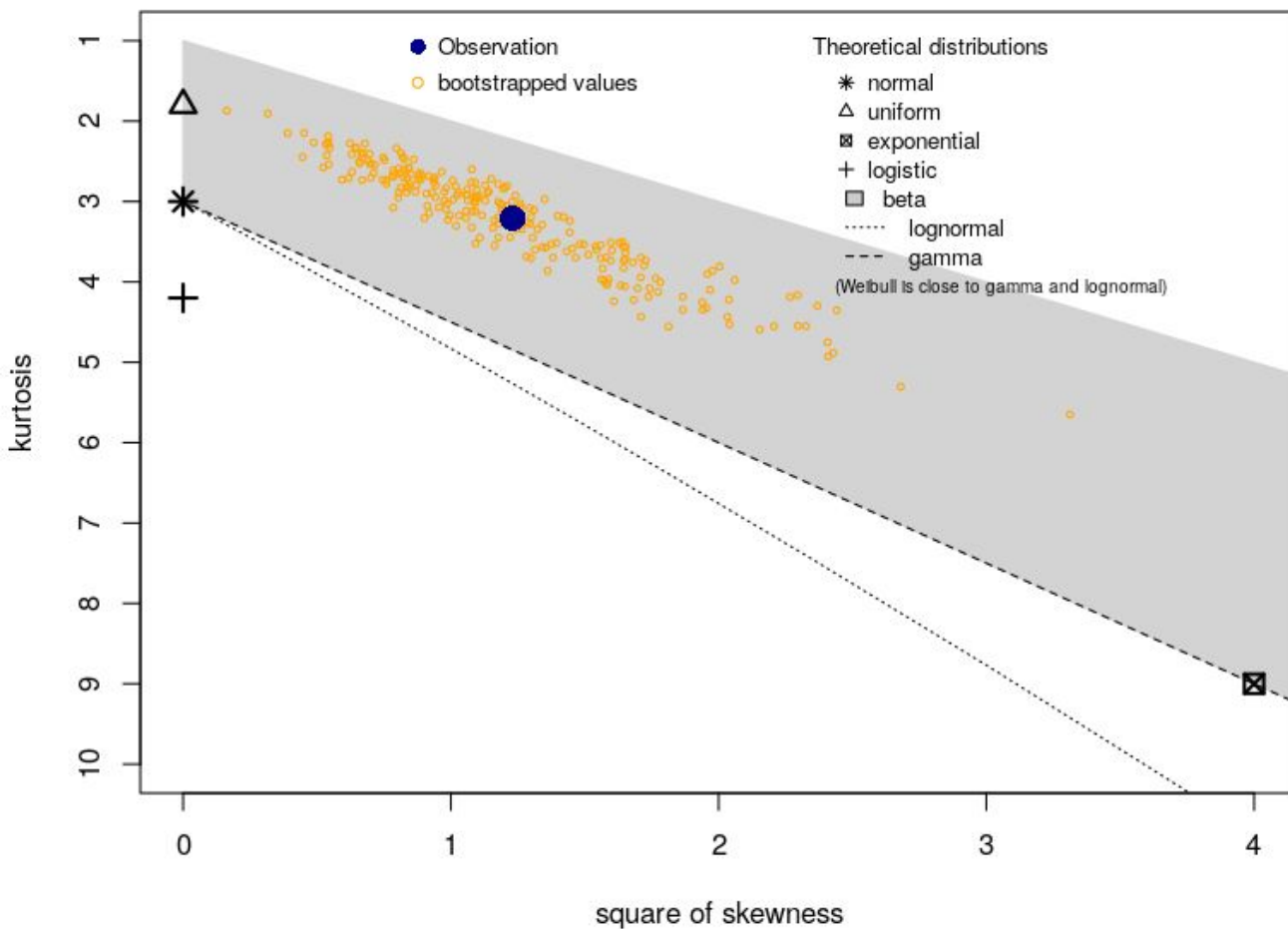
Espaço de Cullen-Frey e PDF

Quantidade diária de mortes - Rússia



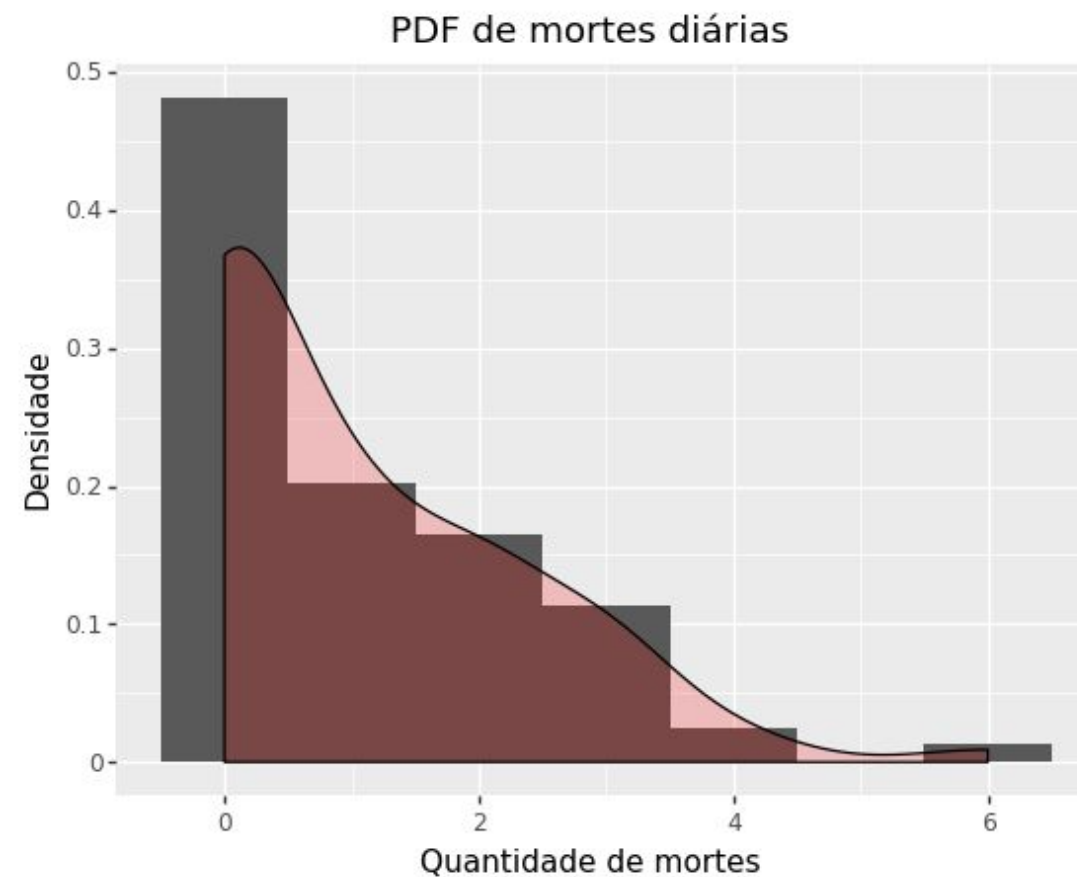
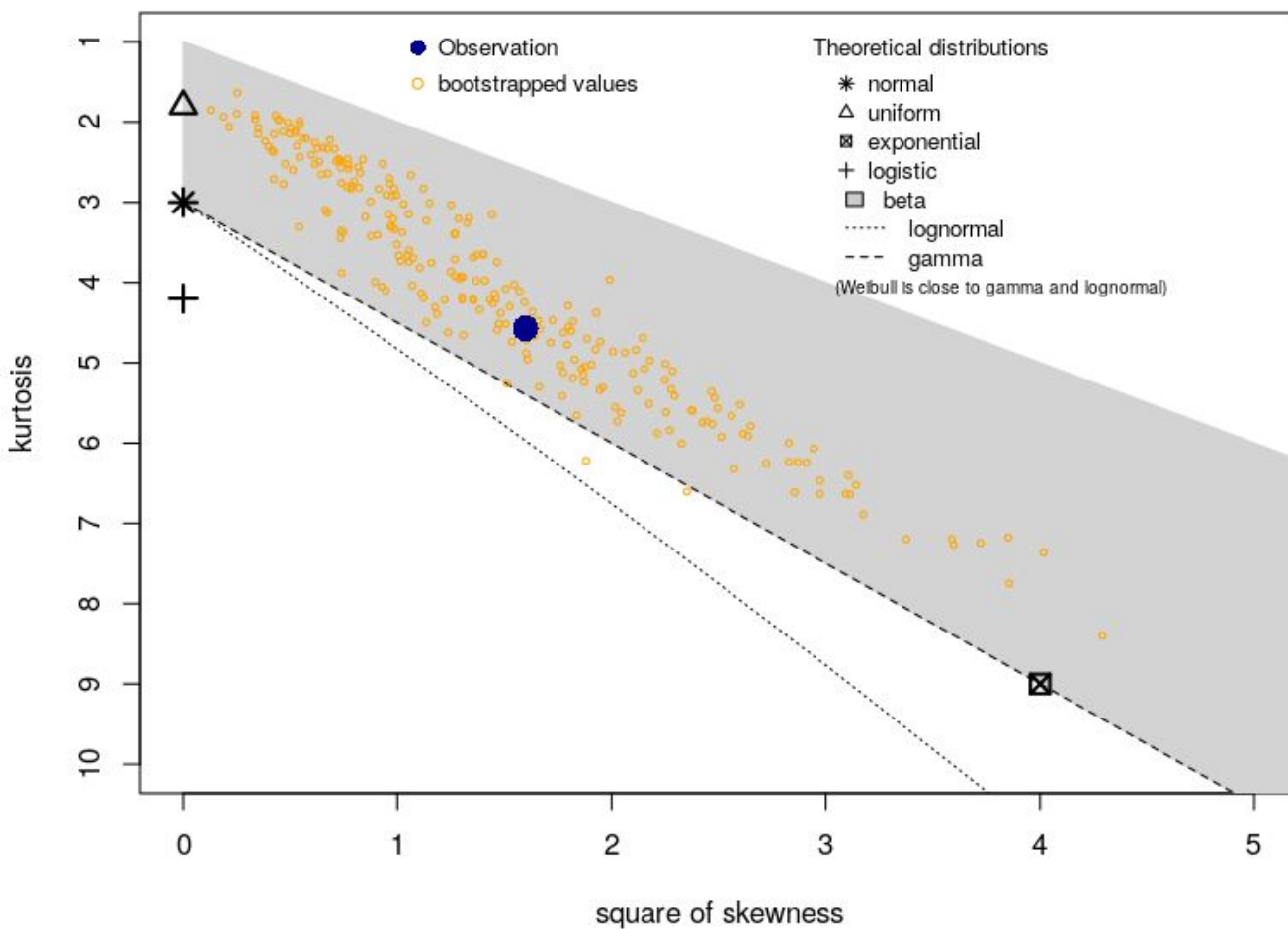
Espaço de Cullen-Frey e PDF

Quantidade diária de mortes - México

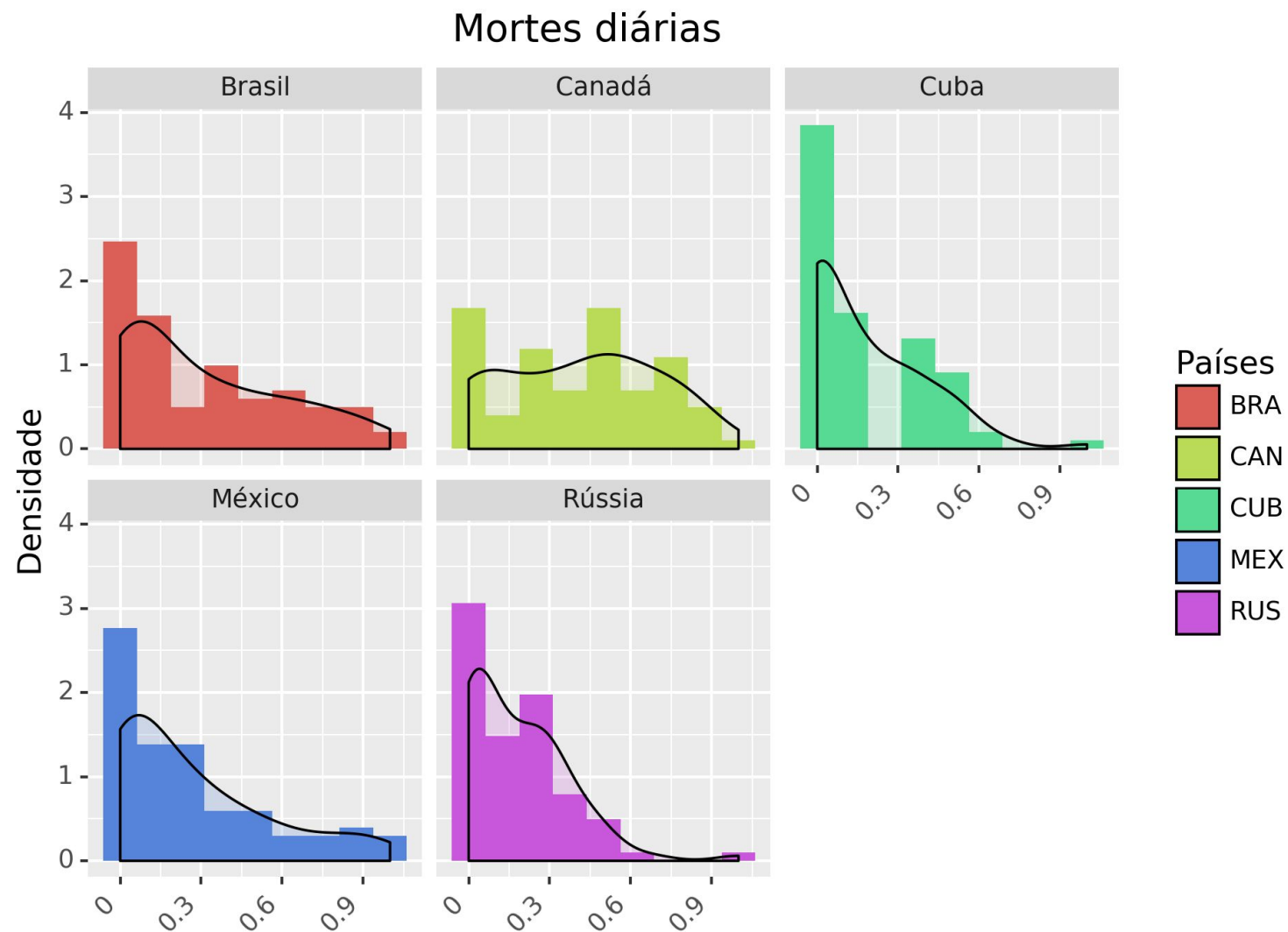


Espaço de Cullen-Frey e PDF

Quantidade diária de mortes - Cuba

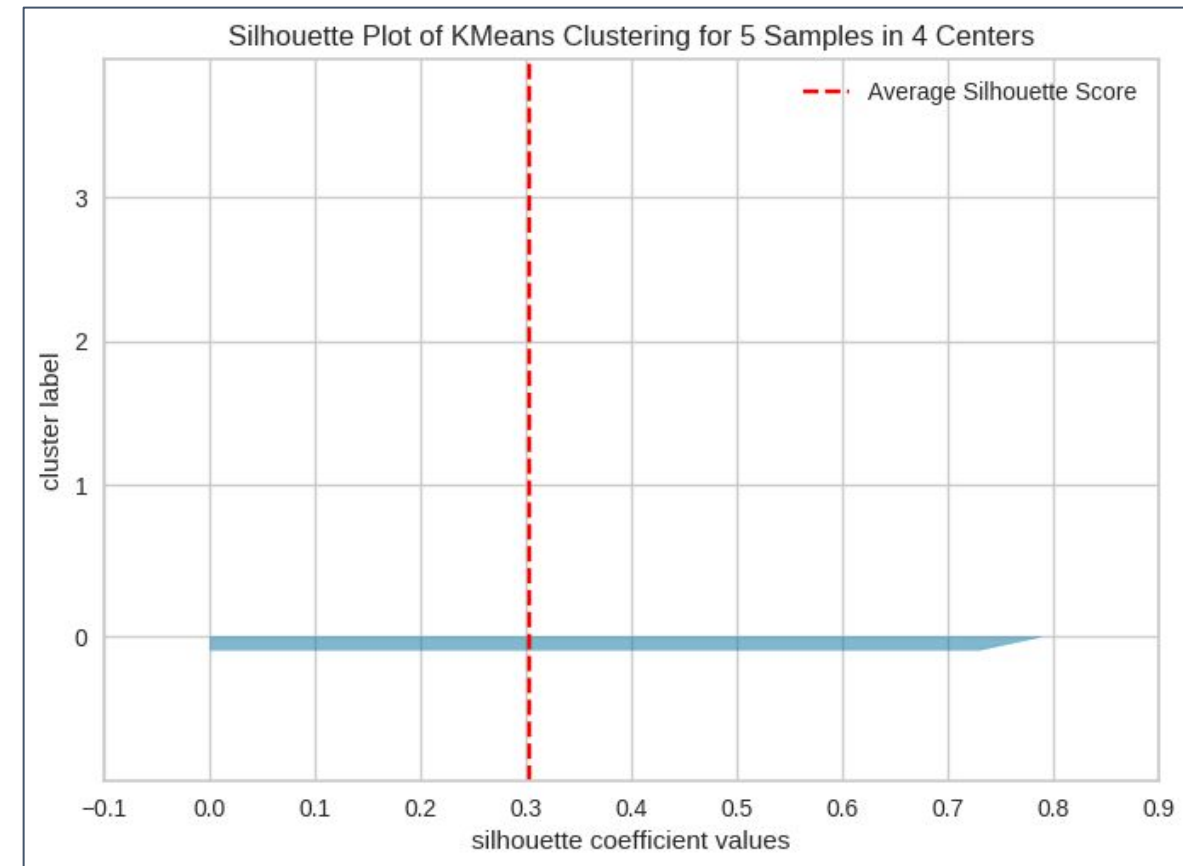
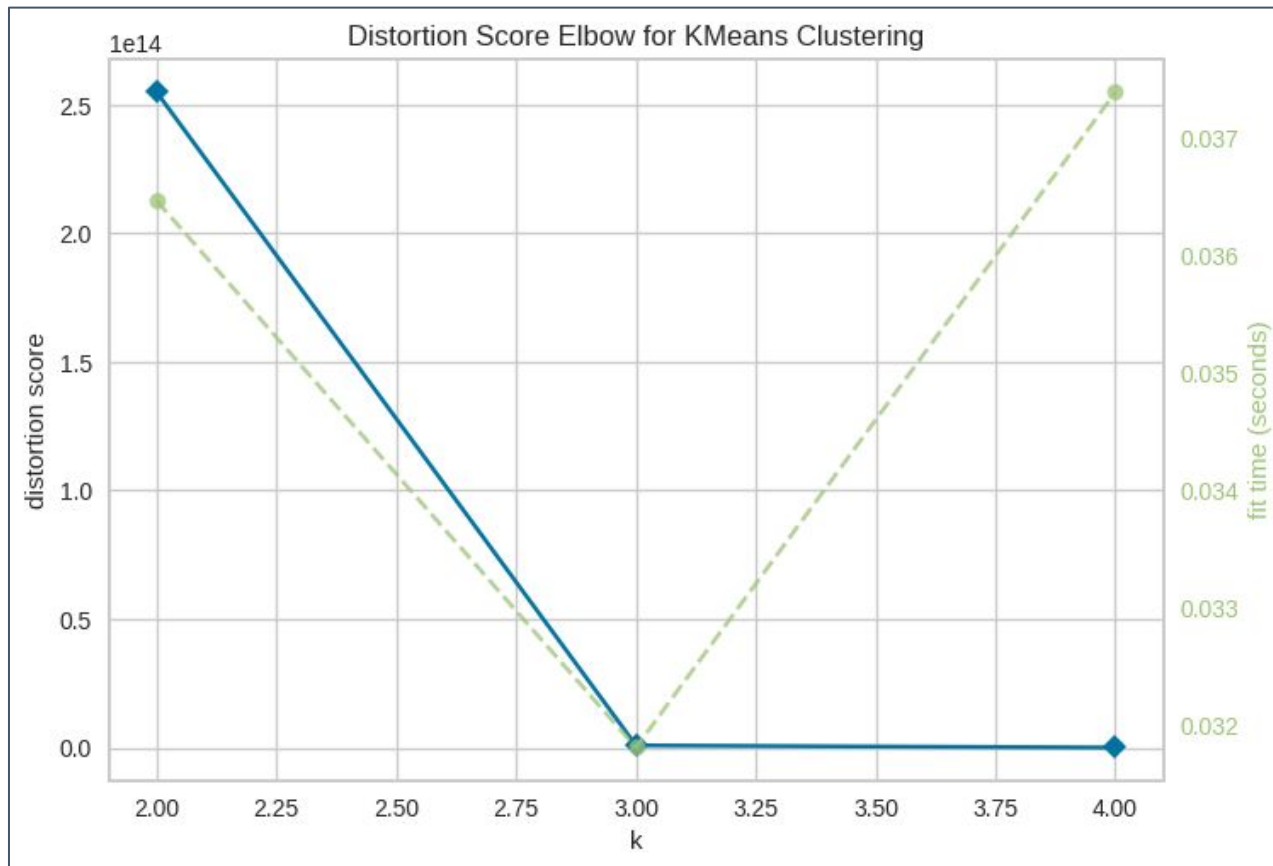


Espaço de Cullen-Frey e PDF



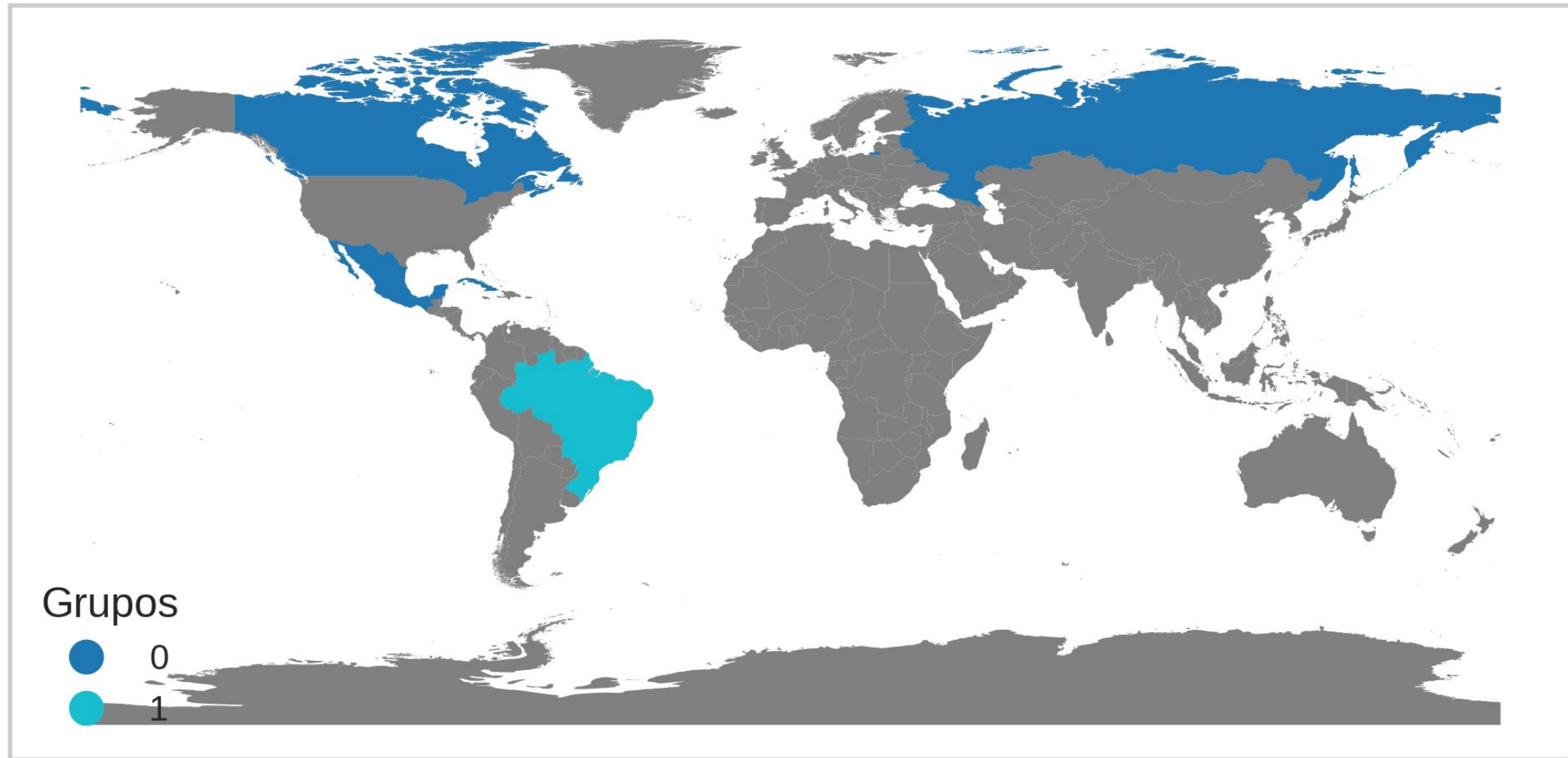
Análise de agrupamento

Problemas com os métodos de verificação de K



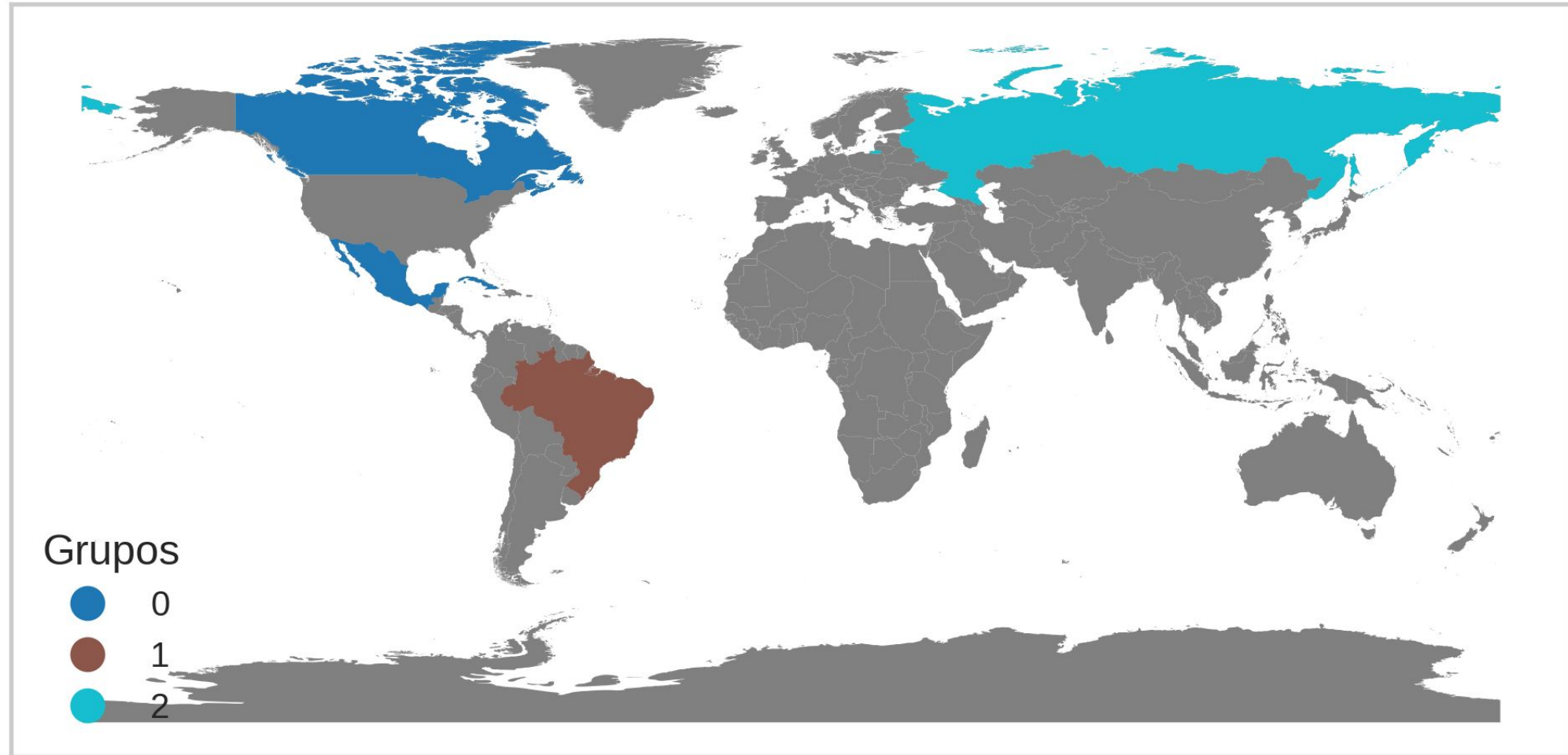
K = 2

Países agrupados pela quantidade diária de casos e mortes



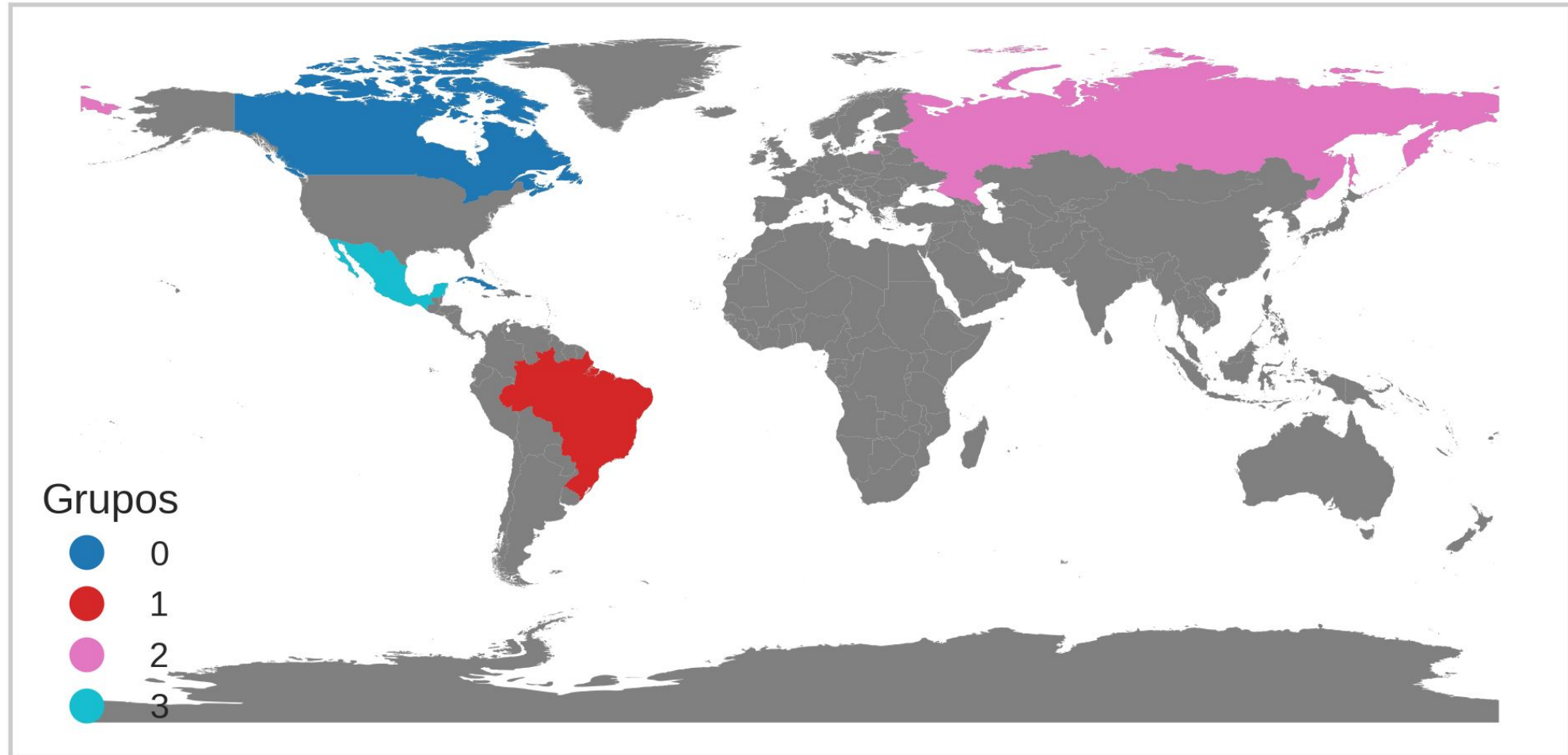
K = 3

Países agrupados pela quantidade diária de casos e mortes



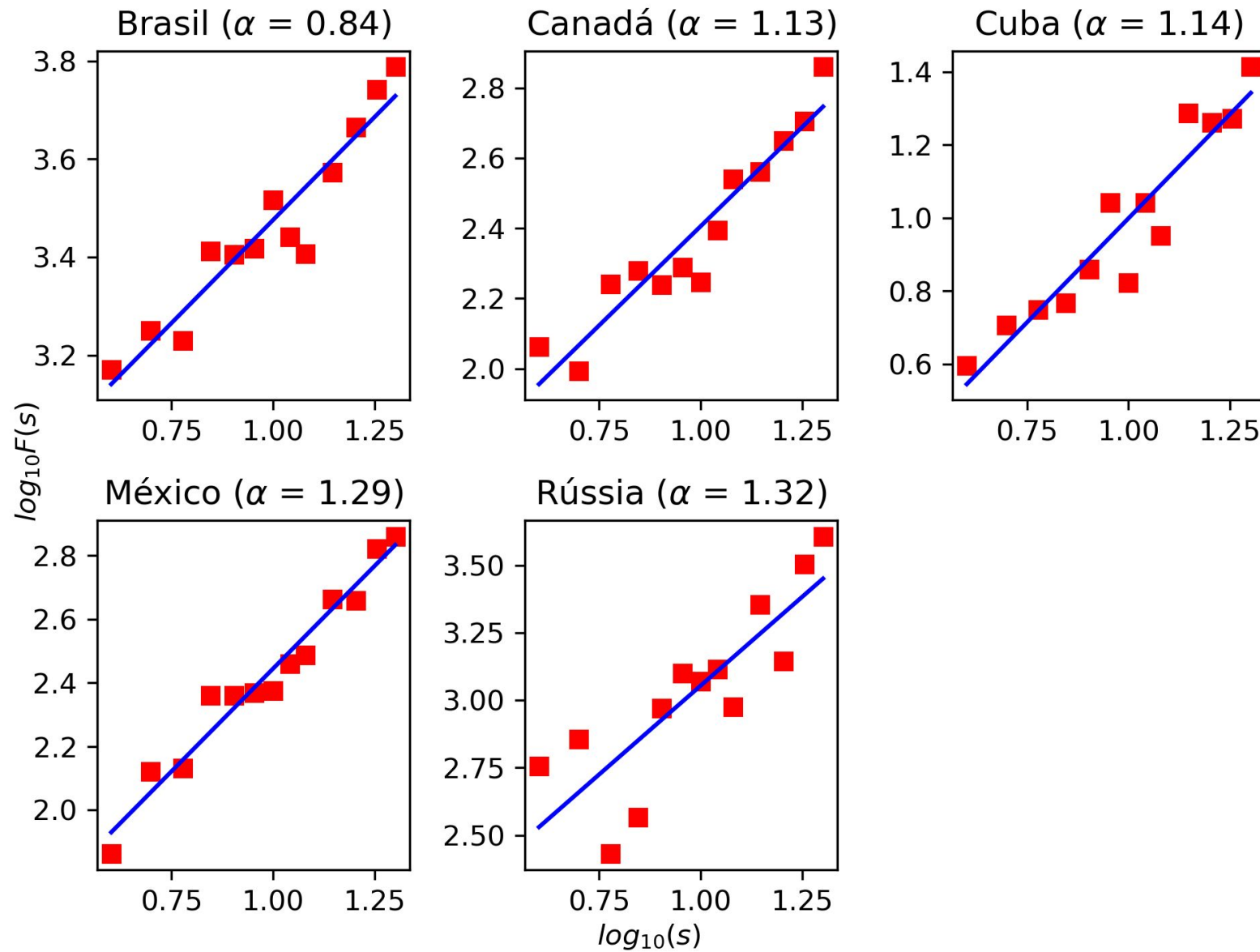
K = 4

Países agrupados pela quantidade diária de casos e mortes



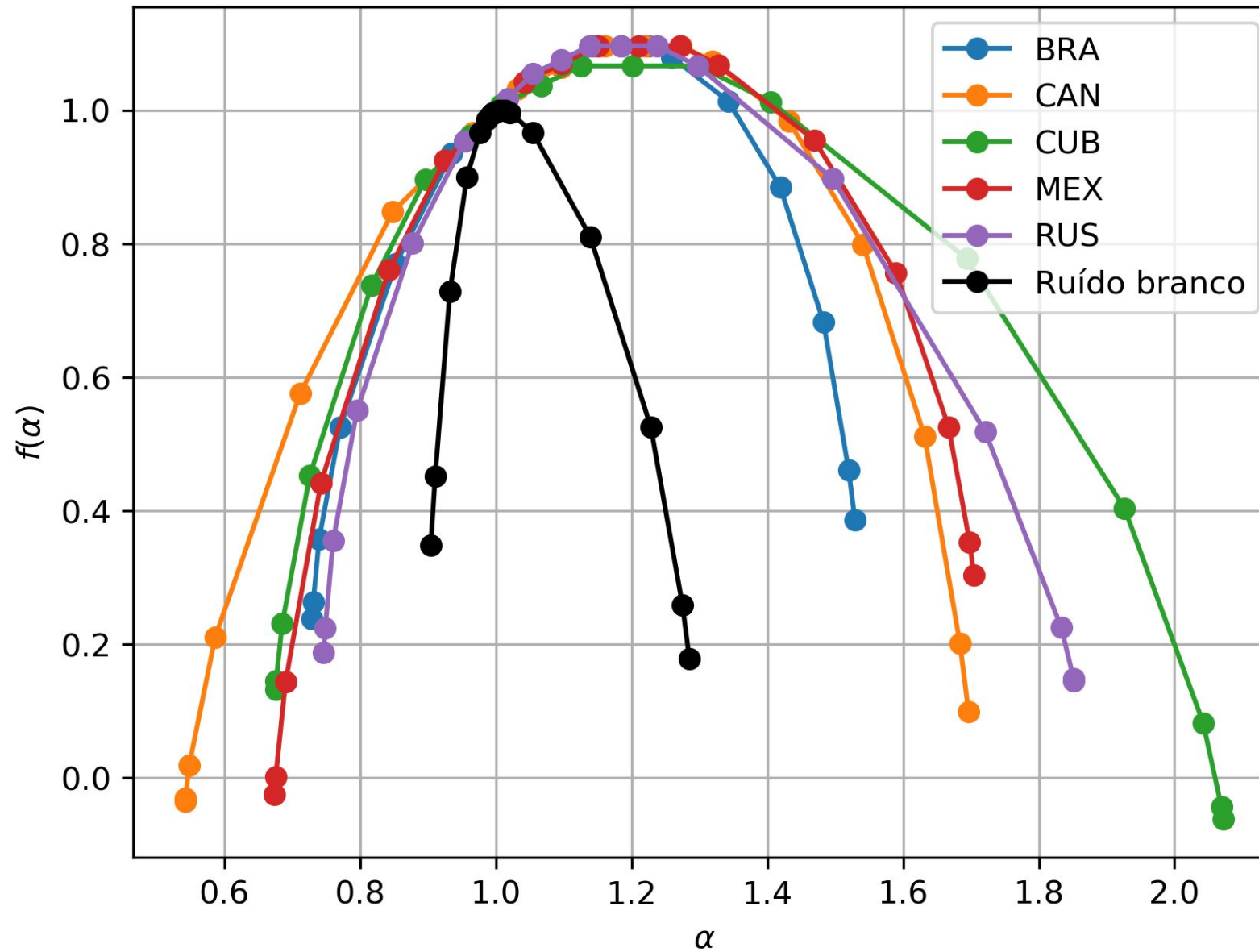
Há longas dependências nas séries temporais ?

Análise DFA



Multifractalidade nas séries temporais

Espectro de singularidade



Análise de regressão