Readme

Growth Model Analysis and Cut-Off Point Estimation in R

This repository provides an analysis of cumulative mortality using classical growth models and change-point detection techniques in R. The study involves fitting **Exponential**, **Gompertz**, and **Logistic** models to both the entire dataset and its segmented parts, based on identified **change points** in mortality trends using a generalized growth model.

To address the limitations of single growth models in capturing complex real-world dynamics, a **piecewise growth modeling approach** is proposed, offering improved accuracy and interpretability across different phases of the epidemic.

Purpose

The goal of this analysis is to:

- Model cumulative mortality over time,
- Compare model performances via AIC and BIC,
- Detect key change points in the progression of mortality data,
- Fit separate models to each detected segment for improved fit.
- **Propose a piecewise growth modeling approach when single growth models fail to adequately represent the dynamics.**

Files

File	Description
`codes.R`	Main R script for full and segmented model fitting
`dataset.xlsx`	Input dataset (Excel format)
`Readme.pdf`	This documentation file

Required Packages

Make sure the following R packages are installed before running the script:

```
# install.packages(c("minpack.lm", "readxl"))
```

Data Availability

The datasets analyzed during the current study were obtained from the publicly available TURCOVID19 repository (https://turcovid19.com), which is licensed under the CC BY-NC-ND 4.0 license. We gratefully acknowledge the open availability of this data source, which enabled the analysis presented in this work.

Note: This work is part of a doctoral research project focused on growth modeling and change-point analysis. The related article has been completed and is currently under review for publication in a peer-reviewed academic journal.