GFT: Generalized fluctuation tests assess stability of regression parameters over time using strucchange::breakpoints(), returning estimated break dates under information criteria.

Generalized Fluctuation Tests (GFT) assess structural changes by examining stability of regression fits across time. In this tutorial we:

* Load and visualize a simple change-point dataset
* Configure and run the GFT-based detector (hcp\_gft)
* Inspect detections, evaluate, and plot results

# Install Harbinger (if needed)  
#install.packages("harbinger")

# Load required packages  
library(daltoolbox)  
library(harbinger)

# Load example change-point datasets  
data(examples\_changepoints)

# Select the simple dataset  
dataset <- examples\_changepoints$simple  
head(dataset)

## serie event  
## 1 0.00 FALSE  
## 2 0.25 FALSE  
## 3 0.50 FALSE  
## 4 0.75 FALSE  
## 5 1.00 FALSE  
## 6 1.25 FALSE

# Plot the raw time series  
har\_plot(harbinger(), dataset$serie)



# Configure the GFT detector  
model <- hcp\_gft()

# Fit the detector (no training required)  
model <- fit(model, dataset$serie)

# Run detection  
detection <- detect(model, dataset$serie)

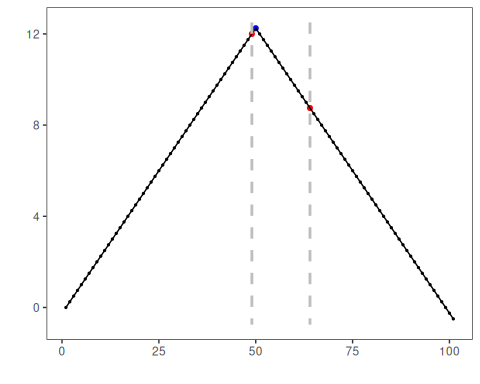
# Show detected change points  
print(detection |> dplyr::filter(event == TRUE))

## idx event type  
## 1 49 TRUE changepoint  
## 2 64 TRUE changepoint

# Evaluate detections against labels  
evaluation <- evaluate(model, detection$event, dataset$event)  
print(evaluation$confMatrix)

## event   
## detection TRUE FALSE  
## TRUE 0 2   
## FALSE 1 98

# Plot detections vs. ground truth  
har\_plot(model, dataset$serie, detection, dataset$event)



References - Zeileis, A., Leisch, F., Kleiber, C., Hornik, K. (2002). strucchange: An R package for testing for structural change in linear regression models. Journal of Statistical Software, 7(2). <doi:10.18637/jss.v007.i02> - Zeileis, A., Kleiber, C., Krämer, W., Hornik, K. (2003). Testing and dating of structural changes in practice. Computational Statistics & Data Analysis, 44(1), 109–123.