Untitled

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```
{r setup, include=FALSE} knitr::opts_chunk$set(echo = TRUE)
```

Introduction

General step:

1. Moving windows
2. Model fitting
3. Confidence Interval
4. Model Compare

Moving windows

Model fitting

GEV models

Linear model

(1) Stationary model

$$\eta = \eta_0$$

(2) Single trend model

$$\eta(t) = \beta_0 + \beta_1 t$$

(3) Double trends model

$$\eta(t) = \eta_0 + \eta_1(1 - D_1)(t - t_1) + \eta_2 D_1(t - t_1)$$

where $D_1 = \begin{cases} 1, & t > t_1 \\ 0, & \textit{other values} \end{cases}$

```
{r results = "asis", echo=FALSE}    para=c("double", "single", "stationary")   co <-
data.frame(mu = NA, sig = NA, sh = NA)   n <- 1   for (i in 1:3) {     for (j in 1:3) {
for (h in 1:3) {         co[n, 1] <- para[i]         co[n, 2] <- para[j]         co[n, 3]
<- para[h]         n <- n + 1       }     }   } knitr::kable(co, caption = "All possible
formulations")
```

Abrupt model

$$\eta = \eta_0$$

$$\eta(t) = \beta_0 + \beta_1 t$$

or

$$\eta(t) = \eta_0 + \eta_1(1 - D_1)(t - t_1) + \eta_1^*(1 - D_1) + \eta_2 D_1(t - t_1) + \eta_2^* D_1$$

where $D_1 = \begin{cases} 1, & t > t_1 \\ 0, & other\ values \end{cases}$

But at least one of the parameters belongs to abrupt shifts.

Quadratic model

$$\eta = \eta_0$$

$$\eta(t) = \beta_0 + \beta_1 t$$

Quadratic

$$\eta(t) = \beta_0 + \beta_1 t + \beta_2 t^2$$

At least one of the parameters belongs to quadratic formula.

Exponantial Model

$$\sigma(t) = e^{\beta_0}$$

$$\sigma(t) = e^{\beta_0 + \beta_1 t}$$

$$\sigma(t) = e^{\beta_0 + \beta_1 t + \beta_2 t^2}$$

GPD models

Confidence Interval

Model Compare