Algorithm 1: Functional Pruning Optimal Partitioning

Data: $\mathbf{y}$ a time series of length N
Input: β a tuning parameter

begin Initialization
  $\mathcal{Q}_1(\mu) \leftarrow (y_1 - \mu)^2$;
  Set the label of $\mathcal{Q}_1(\mu)$ to 0;
  $\tau \leftarrow [\,]$ a list of changepoint;
for *t in [2, ..., N]* **do**
  $F \leftarrow \min_{\mu'} \mathcal{Q}_{t-1}(\mu')$;
  $\mathcal{Q}_t(\mu) \leftarrow \min([\mathcal{Q}_{t-1}(\mu),\ F + \beta]) + (y_t - \mu)^2$;
  $\tau^* \leftarrow \textit{label}\ (\arg\min_{\mu} \mathcal{Q}_t(\mu))$;
  $\tau \leftarrow \tau + [\tau^*]$; where + defines concatenation;
begin Backtracking
  $cp \leftarrow [N]$;
  $i \leftarrow N$;
  while $\tau_i \neq 0$ **do**
    $cp \leftarrow [\tau_i] + cp$;
    $i \leftarrow \tau_i$
begin Finalization
  Return cp