Recently, we showed that bootstrap procedures for scale analysis efficiently discriminate Gaussian self-similar processes from multifractal processes. In the present contribution, we propose a new joint time-scale block bootstrap and investigate the relevance of estimation and bootstrap procedures to discriminate non-Gaussian finite variance self-similar processes with stationary increments and multifractal processes.

**Bootstrap Procedures**

**Time Block and Time-Scale Block Bootstrap**

- **Bootstrap Procedure**
  - For $t_0 = 1, \ldots, B$
  - $\hat{\Theta}(t, s, 2) \sim \text{MC}$
  - $\hat{\Theta}(t, s, 2) \sim \text{MC}$

**Time Block**

- $\hat{\Theta}(t, s, 2)$ are obtained by time scale-level steps
- $\hat{\Theta}(t, s, 2)$ is the time-scale scale of the time block bootstrap
- $\hat{\Theta}(t, s, 2)$ capture joint time-scale dependence of coefficients

**Time-Scale Block**

- $\hat{\Theta}(t, s, 2)$ are obtained by time scale-level steps
- $\hat{\Theta}(t, s, 2)$ capture joint time-scale dependence of coefficients

**Bootstrap Hypothesis Tests**

- **Test $d_k^*$**
  - **null**: $d_k^* \rightarrow 0$ against double-sided alternative

**Monte Carlo Simulation**

- **Experimental Setup**
  - Apply procedure to $y_{t0}$ randomization of length $n$
  - Test $d_k^*$

**Results**

- **Bootstrap performance**
  - $d_k^*$: non-zero standard deviation
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  - $d_k^*$: non-zero standard deviation

**Performance of Estimation**

- **Time Block vs. Time-Scale Block Bootstrap**
  - $d_k^*$: small differences for $d_k^*$
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  - $d_k^*$: small differences for $d_k^*$

**References**