

# ONLINE EMPIRICAL MODE DECOMPOSITION

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## Classical EMD

- ✓ Dissects a non-stationary signal into a collection of additive oscillatory components called Intrinsic Mode Functions (IMF).
- ✗ Issues with large datasets: Need the entire signal at once, requires increasing computational resources with growing data.

## Online EMD

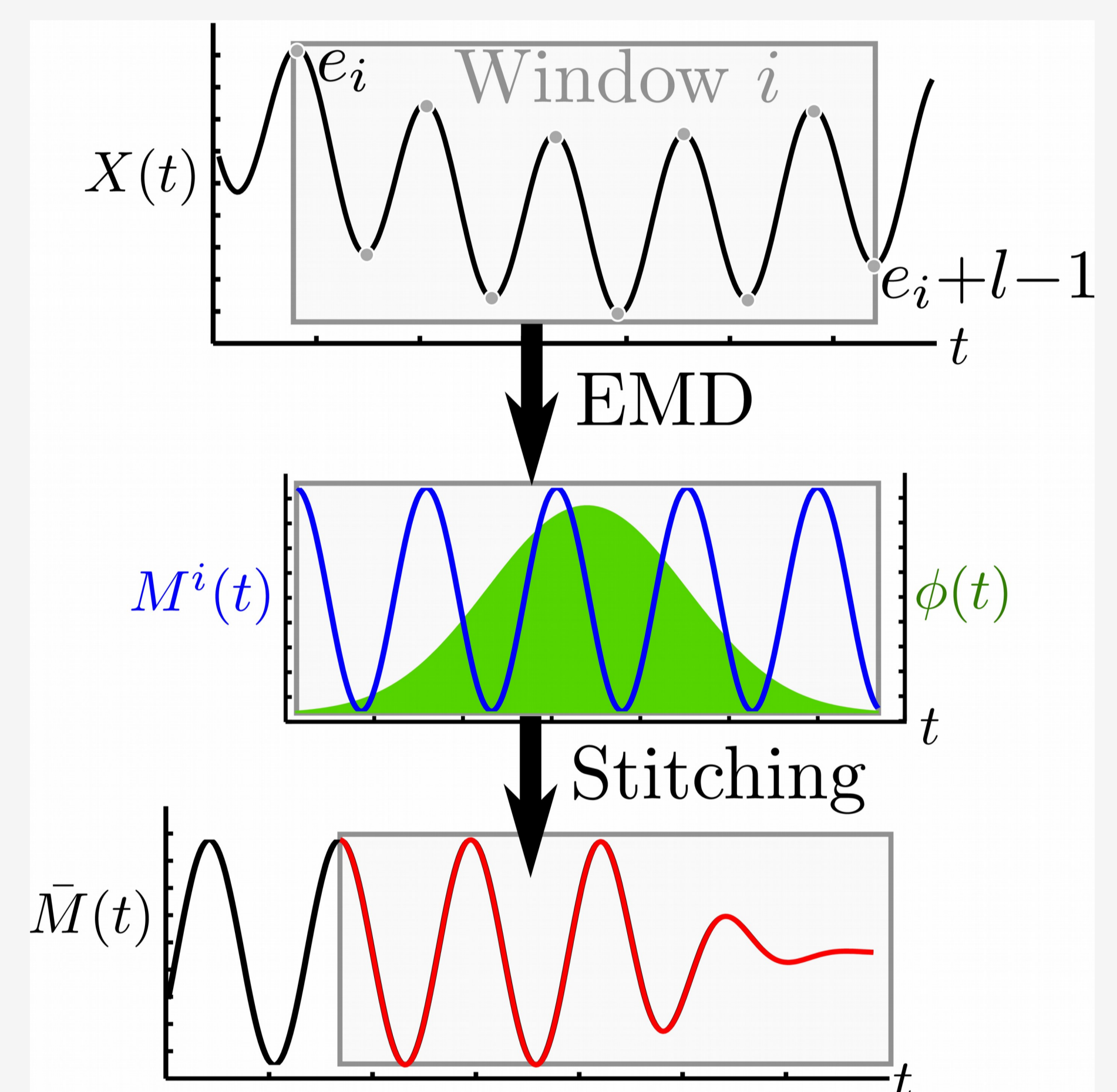
**Goal:** Online implementation of EMD with

**Algorithm:**

- Sliding window encompassing  $l$  local extrema
- Extract fastest oscillation with classical EMD
- Stitch with previously extracted modes (weight overlapping modes using a window function)
- Repeat on residual data

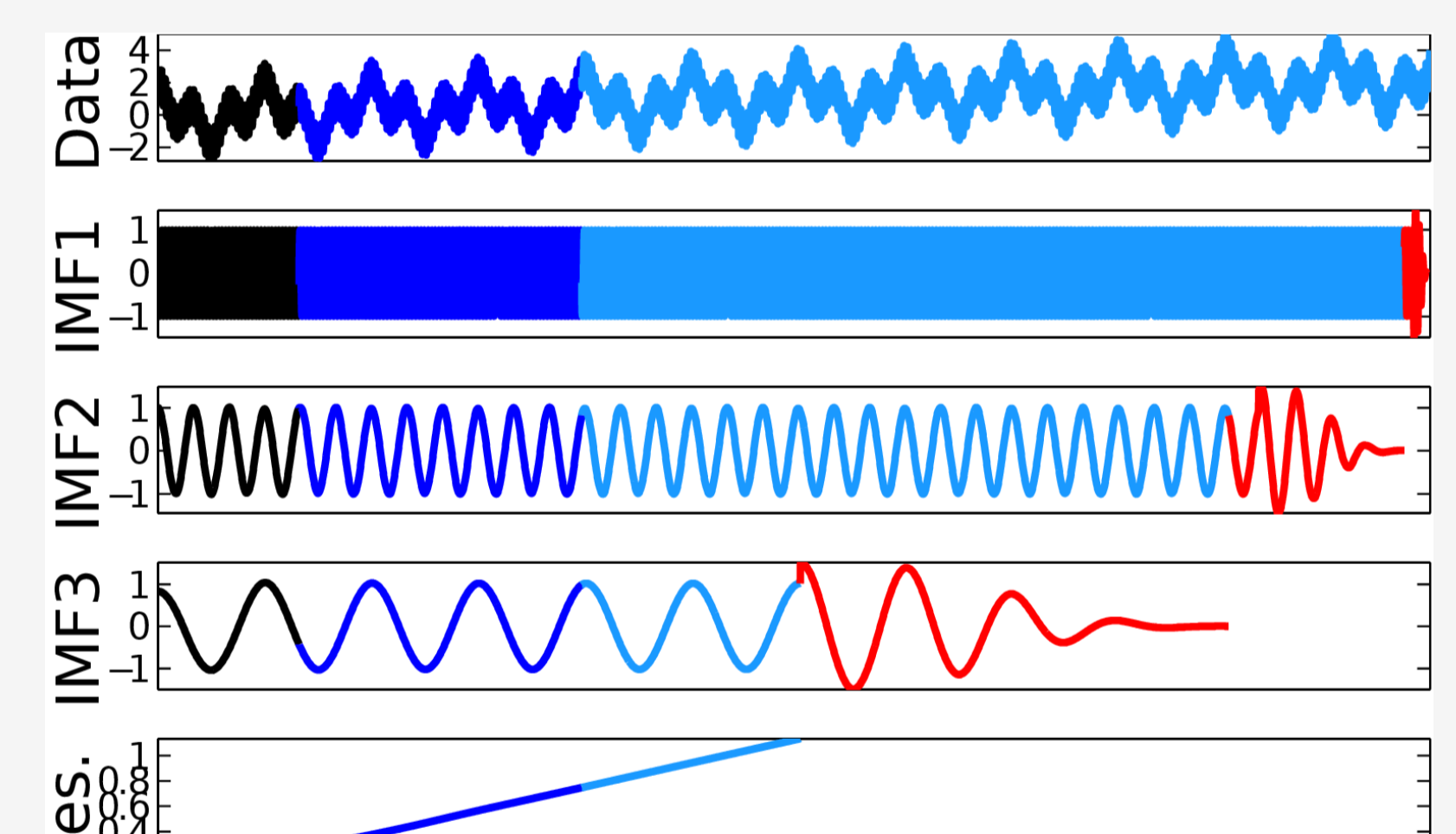
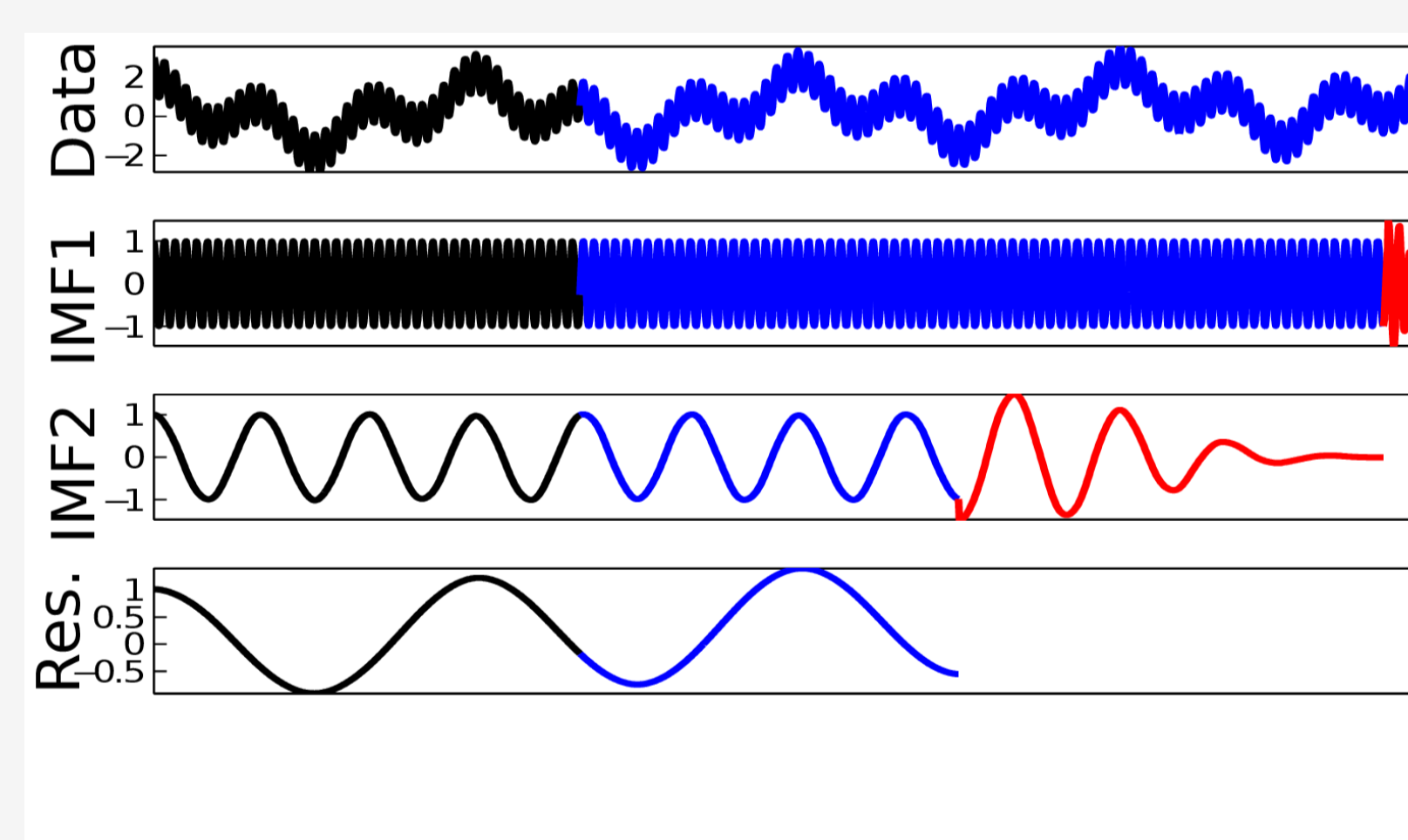
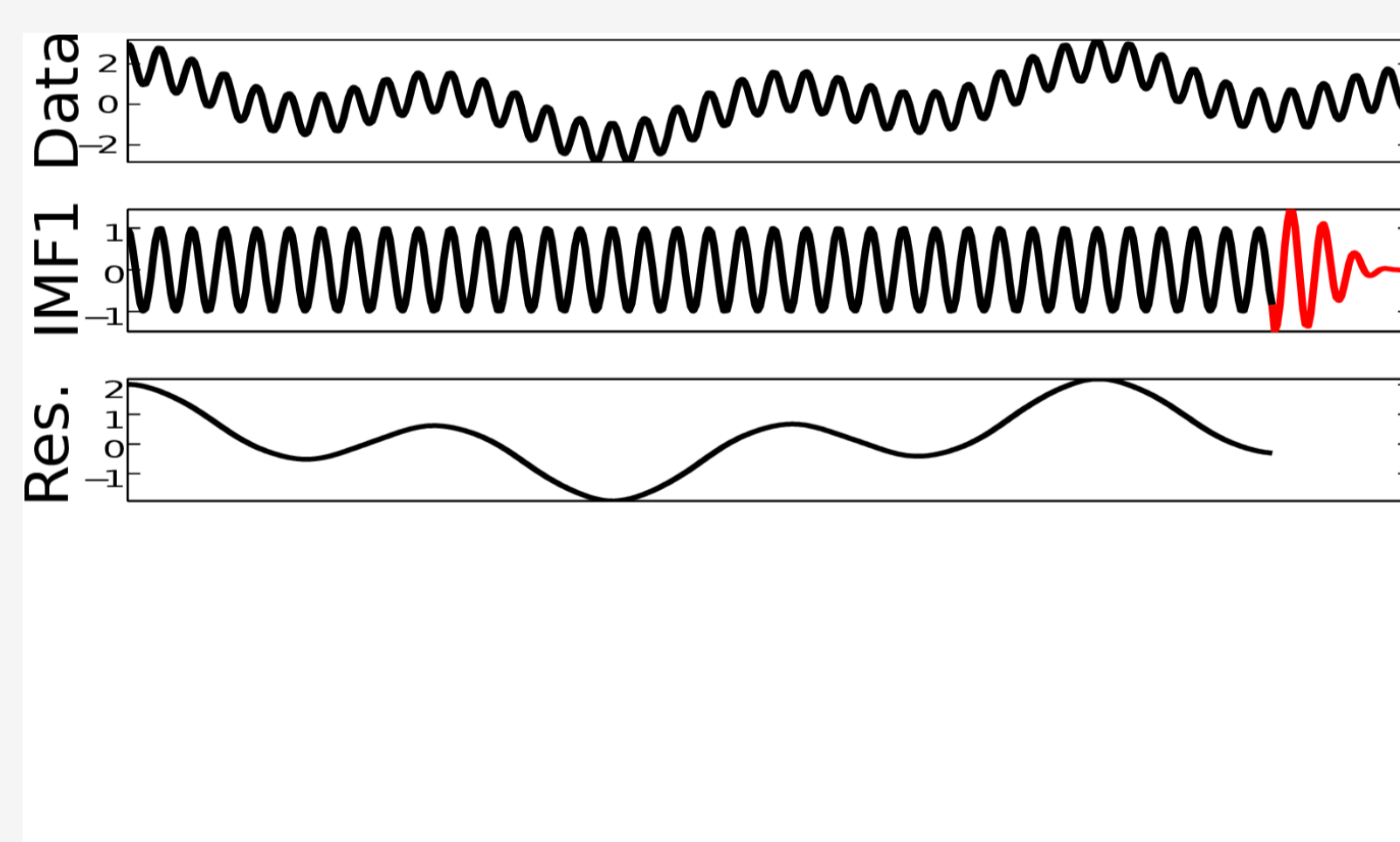
**Advantages:**

- Low computation/memory requirements for data stream
- EMD-like: gradually uncover components, no a priori knowledge required
- Can be used with any sifting stopping criterion

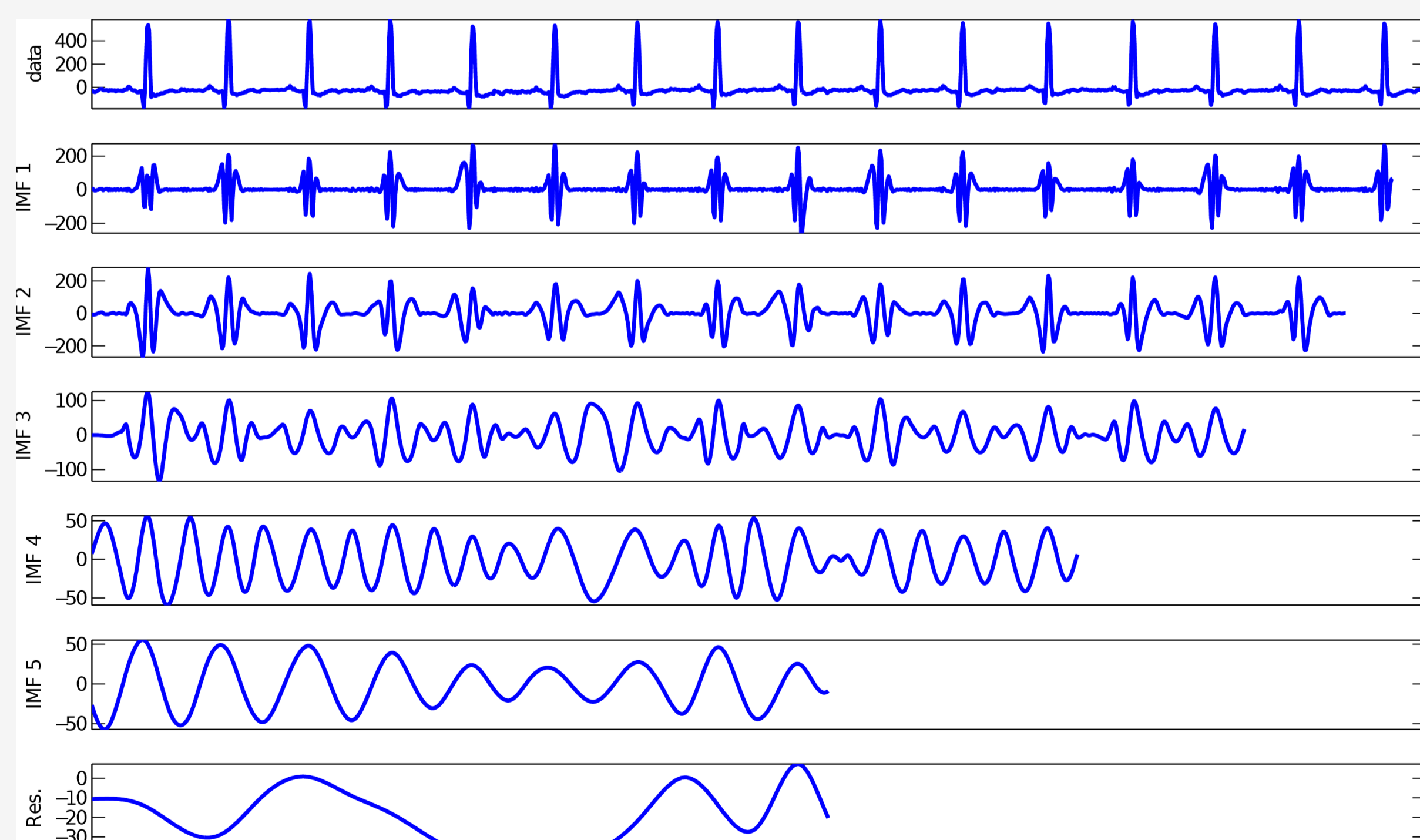


## Results

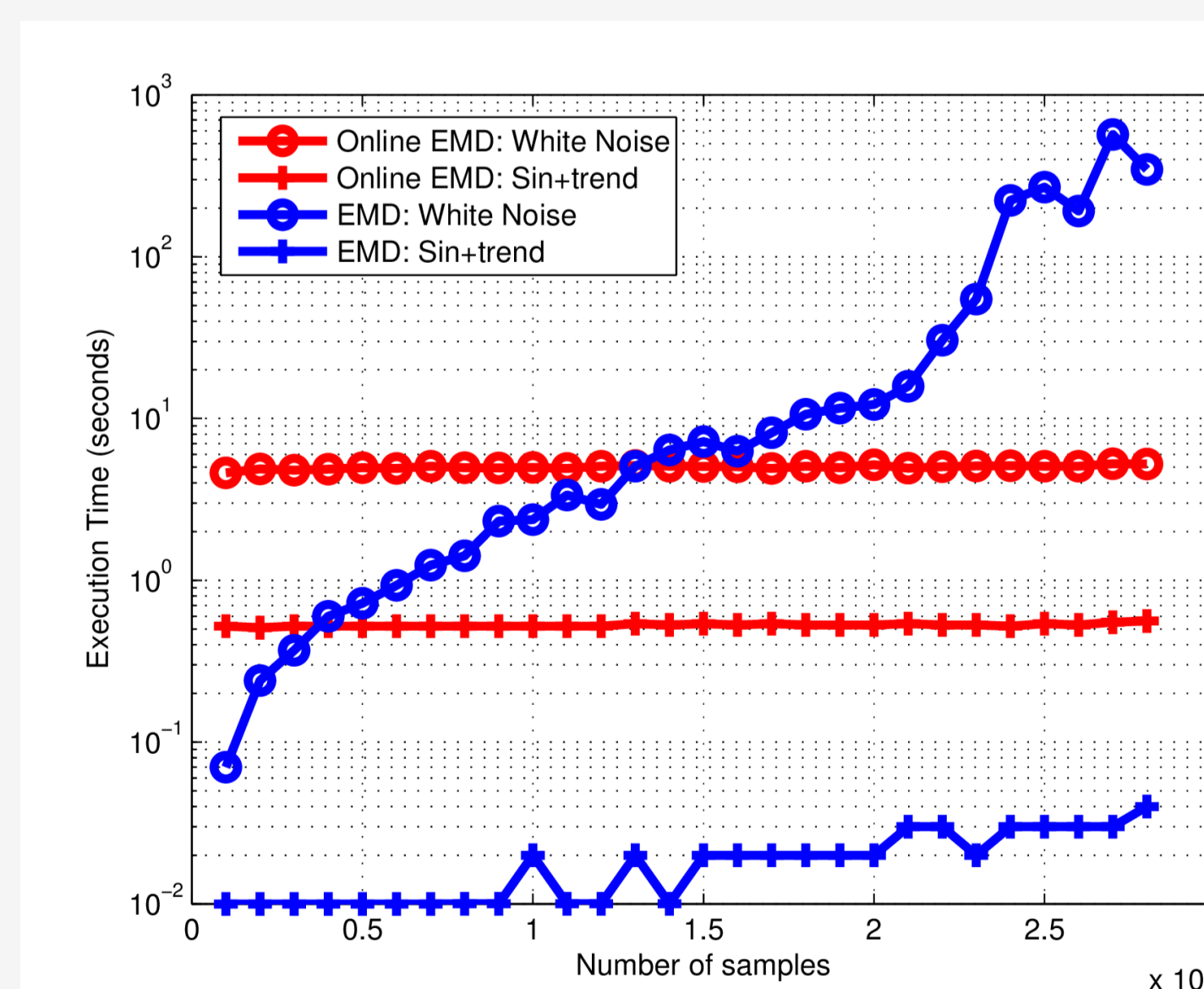
Online EMD after analyzing 500, 1500 and 4500 samples:



Example with real data (ECG signal):



Execution time:



Parameter sensitivity:

