Exercise: Estimating Breathing Frequency

You are provided with a radar data set that contains breathing patterns. Your task is to estimate the frequency of breathing in beats per minute (bpm), but you must adhere to the following constraints:

- **Window Size**: You can only use a time window of up to 20 seconds from the data.
- **No FFT**: Frequency estimation should be done without using Fourier Transform techniques.
- **No Phase Unwrap**: Avoid any phase unwrapping methods.

Instructions:

1. Analyze the given radar data to detect periodic patterns corresponding to the breathing cycle.
2. Choose an alternative method for estimating frequency (e.g., zero-crossing, autocorrelation, or peak detection).
3. Use the time window to estimate how many cycles (breaths) occur and compute the breathing frequency in bpm.
4. Show all steps in your estimation process and justify the approach you selected.

Deadline: October 18th

Credit: 1 ECTS