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## ”SIGPRO#3 - Enhancing the Performance of the Multi-Order Probabilistic Approach in Angular Speed Estimation through Adaptive Window Selection”

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The Multi-Order Probabilistic Approach (MOPA) is a method for estimating the instantaneous angular speed from vibration signals with high precision. However, determining the optimal choice of inputs can be challenging as the method requires many input parameters, including the window size selection used to generate the spectrogram for computing the probability density functions. This study presents a new approach that utilises statistical indicators to evaluate the information content of various window sizes and selects the optimal size for each signal segment. The algorithm is tested using simulated sensor data and real data from offshore wind turbines, and the results are compared to benchmark parameters such as the Root Mean Squared Error (RMSE). The results show that the proposed approach provides similar accuracy in estimating angular speed without the necessity to pre-select a window size for the spectrogram. Overall, this study demonstrates that using an adaptive window based on statistical indicators can improve the flexibility of MOPA as well as reduce the time required to detect the appropriate window for each data set.

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