

Guidelines for MSSP Papers on Signal Processing.

MSSP receives many papers whose main objective is to introduce new signal processing and/or data mining methods. Although it is not possible nor desirable to define how such papers should ideally be constituted, some general recommendations are in order for reaching the high quality standards required by the journal. Common pitfalls to be avoided can also be identified.

- Of primary concern in a scientific paper is to introduce objectives, justify all choices, identify the working assumptions, position the contribution with respect to the state-of-the-art, provide a timely and contextual literature survey, and clearly demonstrate theoretically and/or experimentally the originality and benefits of the approach.
- Highly theoretical papers (e.g. in signal processing, data-mining, control engineering, system identification) should clearly state their connection with the topics covered by MSSP scope, with particular attention paid to potential applications in mechanics (MSSP scope is not separated into mechanics and signal processing disciplines, but combines them in new ways at the frontier of the two disciplines).
- Although not mandatory, the inclusion of references pertaining to MSSP archives is one indication that the submitted work may find an intersection with MSSP scope.
- In general, the manuscript should contain an introduction that discusses the relevance of its subject with respect to MSSP scope and lists the potential applications in related domains.
- The use of extremely specialized terminologies or mathematical notations without preliminary introduction is an indication that the manuscript should rather be submitted to other scientific journals whose scopes are more relevant to the related domain.
- Being mainly oriented towards applications in mechanical engineering, it is strongly recommended that manuscripts submitted to MSSP present experimental results on industrial or laboratory data or, if this is not possible, on synthetic data realistic enough to be representative of the real-world complexity.
- Papers which aim at introducing in the mechanical community new processing tools (e.g. signal processing, control engineering, data mining) should clearly demonstrate the benefits of adopting them by means of a comprehensive benchmark. Comparison with cutting edge tools from the state-of-the-art in a comprehensive experimental setup is advised (e.g. analysis on at least two different datasets). The validation of a proposed method on only one example is often insufficient to convince MSSP readers.

- For a contribution to be considered in MSSP, it should demonstrate some conceptual novelty as compared to the existing literature. Direct application of an existing method to a database is considered as a case study, which is rarely accepted unless it evidences some breakthroughs.
- For a new technique to be published, it must demonstrate a clear advantage for instance from theoretical, numerical, or experimental points of view. Proving the "feasibility of the approach", whatever legitimate and necessary, is not sufficient per se for a publication.
- **Case studies** are usually not considered for publication because of the difficulty of generalizing from the single case. For a case study to be published, it should clearly demonstrate an increase of knowledge, a better understanding of a scientific problem, or an impetus for research.
- Papers where originality is said to lie in the **combination of methods** should clearly justify the motivations beyond the choice of each individual method and the relevance of their combination. Detailed explanations are expected of the underlying mechanisms that make the proposed combination preferable or optimal as compared to other possibilities.
- **Reproducible research** is an essential requirement for papers submitted to MSSP. This means that efforts should be spent to provide the reader with all the required elements of information to reproduce laboratory or numerical experiments independently. The requirement applies in particular to simulated data and to the setups used in benchmarks of methods.
- The data from the **Case Western Reserve University Bearing Data Center** have been used by many researchers and is known for presenting various degrees of difficulty for diagnosis. A good review against which any new proposed method should be tested is, for instance: Wade A. Smith, Robert B. Randall, Rolling element bearing diagnostics using the Case Western Reserve University data: A benchmark study, Mechanical Systems and Signal Processing, Volumes 64–65, December 2015, Pages 100-131, ISSN 0888-3270. Information on the signals which are processed in the database is compulsory. The demonstration of the benefits of a new signal processing method will be all the more convincing as it is able to resolve several difficult cases in the database. Demonstration of the benefit of the method on at least one another data set is recommended.