Editorial

Symmetry in Applied Continuous Mechanics

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Abstract: Engineering practice requires the use of structures containing identical components or parts, which are useful from several points of view: less information is needed to describe the system, design is made quicker and easier, components are made faster than a complex assembly, and finally the time to achieve the structure and the cost of manufacturing decreases. Additionally, the subsequent maintenance of the system becomes easier and cheaper. This Special Issue is dedicated to this kind of mechanical structure, describing the properties and methods of analysis of these structures. Discrete or continuous structures in static and dynamic cases are considered. Theoretical models, mathematical methods, and numerical analysis of the systems, such as the finite element method and experimental methods, are expected to be used in the research. Such applications can be used in most engineering fields including machine building, automotive, aerospace, and civil engineering.

Keywords: symmetry; topology; mechanical structures; robots; vibration; mechanical engineering; applied mechanics

1. Introduction

In engineering, including civil engineering, machinery construction industry, automotive industry, and the aerospace industry, there are products, elements, machines, and components that contain identical, repetitive parts, which have different types of symmetries. In the constructions, most buildings, works of art, halls etc have identical parts and have symmetries, because symmetry is beneficial for an easy, fast, cheaper and aesthetic design. These properties can be successfully used to facilitate static and dynamic analysis of some structures. The symmetries of different types that offer structure-specific properties have long been observed and used especially in the static case. They are presented in the classical courses of Strength of Materials or Structural Analysis. Symmetries in mechanics have been studied mainly from the point of view of mathematicians [1,2]. In January 2018, a Special Issue of Symmetry Magazine dedicated to applications in structural mechanics was launched [3]. A European project was also funded to study this type of problem [4] and courses were held at the Center for Solid Mechanics CISM from UDINE (Similarity, Symmetry and Group Theoretical Methods in Mechanics, 7 September 2015. Lectures were delivered at the International Center for Mechanical Sciences). Symmetry in Applied Continuous Mechanics was developed in the last decades [5,6].

2. Statistics of the Special Issue

The statistics of papers called for this Special Issue related to published or rejected items were [7–20]: total submissions (21), published (13; 62%), and rejected (8; 38%). The authors' geographical distribution by countries of authors in published papers is shown in Table 1, and it can be seen that 35 authors are from 11 different countries. Note that it is usual for a paper to be signed by more than one author and for authors to collaborate with authors with different affiliations.

Table 1. Geographic distribution by countries of authors.

Country	Number of authors
Romania	10
Saudi Arabia	2
Pakistan	1
China	7
England	1
Turkey	1
Iran	3
Japan	1
Egypt	2
Poland	2
Spain	5
Total	35

3. Authors of the Special Issue

The authors of this Special Issue and their main affiliations are summarized in Table 2, and it can be seen that there are four authors on average per manuscript.

Table 2. Affiliations and bibliometric indicators for authors.

Author	Affiliation	Reference
Iuliu Negrean	Technical University of Cluj-Napoca, Romania	9
Adina Veronica Crisan	Technical University of Cluj-Napoca, Romania	9
Silviu Năstac	"Dunarea de Jos" University of Galati, Romania	10
Carmen Debeleac	"Dunarea de Jos" University of Galati, Romania	10
Sorin Vlase	Transilvania University of Brașov, Romania	10,11,15,17
Marin Marin	Transilvania University of Brașov, Romania	11,15,17,19
R. Ellahi	King Fahd University of Petroleum & Minerals, Saudi Arabia International Islamic University (IIUI), Pakistan	11
M.M. Bhatti	Shandong University of Science and Technology, China Shanghai University, China	11
Eliza Chircan	Transilvania University of Brașov, Romania	12
Maria Luminița Scutaru	Transilvania University of Brașov, Romania	12

Cătălin Iulian Pruncu	Imperial College, London, UK University of Birmingham, UK	12
Zhang Yue	Hainan Radio and TV University, China	13
Dumitru Băleanu	Cankaya University, Ankara, Turkey Institute of Space Sciences, Bucharest-Magurele, Romania	13,14,20
Ji-Jun Pan	Dianxi Science and Technology, Normal University, China	14
Mohammad Reza Mahmoudi	Fasa University, Iran	14
Mohsen Maleki	Shiraz University, Iran	14
Mariana Stanciu	Transilvania University of Brașov, Romania	15
Xinghan Xu	Kyoto University, Japan	16
Weijie Ren	Dalian University of Technology, China	16
Mohamed I. A. Othman	Zagazig University, P.O. Box 44519 Zagazig, Egypt	17,19,21
Lavinia Codarcea-Munteanu	Transilvania University of Brașov, Romania	17
Krzysztof Kamil Żur	Bialystok University of Technology, Poland	18
Piotr Jankowski	Bialystok University of Technology, Poland	18
Elsayed M. Abd-Elaziz	Zagazig Higher Institute of Engineering & Technology, Egypt	19
Behzad Ghanbari	Kermanshah University of Technology, Iran	20
Maysaa Al Qurashi	King Saud University, Riyadh, Saudi Arabia	20
Noelia Bazarra	Universidade de Vigo, Spain	7
José A. López-Campos	Departamento de Ingeniería Mecánica, Escola de Enxeñaría Industrial, Vigo, Spain	7
Marcos López	Departamento de Ingeniería Mecánica, Escola de Enxeñaría Industrial, Vigo, Spain	7
Abraham Segade	Departamento de Ingeniería Mecánica, Escola de Enxeñaría Industrial, Vigo, Spain	7
José R. Fernández	Universidade de Vigo, Spain	7
Yadong Zhou	Nanjing University of Aeronautics and Astronautics, Nanjing, China	8
Youchao Sun	Nanjing University of Aeronautics and Astronautics, Nanjing, China	8
Tianlin Huang	Commercial Aircraft Engine Co., LTD, Shanghai, China	8

4. Brief Overview of the Contributions to the Special Issue

The analysis of the topics identifies the research undertaken. This section classifies the manuscripts according to the topics proposed in the Special Issue. It was observed that there are three topics that have dominated the others: symmetry in mechanical engineering; symmetry in applied mathematics and symmetry in civil engineering.

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