

Composite Structures with Symmetry

Marin Marin ^{1,*}, Dumitru Băleanu ^{2,*} and Sorin Vlase ^{3,*}

¹ Department of Mathematics and Computer Science, Transilvania University of Braşov, 500036 Braşov, Romania

² Department of Mathematics, Faculty of Art and Sciences, Cankaya University, 0630 Ankara, Turkey

³ Department of Mechanical Engineering, Faculty of Mechanical Engineering, Transilvania University of Braşov, 500036 Braşov, Romania

* Correspondence: m.marin@unitbv.ro (M.M.); dumitru.baleanu@gmail.com (D.B.); svlase@unitbv.ro (S.V.); Tel.: +40-722-643020 (S.V.)

Abstract: In recent years, the use of composite materials in structural applications has been observed. The composites have revolutionized the field of materials and allow for interesting and new developments in different engineering branches. At the same time, in all areas of engineering, there are some products or parts of products or components that contain repetitive or identical elements. Here, different types of symmetry can occur. Such systems have been studied by various researchers in the last few decades. In civil engineering, for example, most buildings, works of art, halls, etc. have, in their structure, identical parts and symmetries. This has happened since antiquity, for different reasons. First, because of their easier, faster, and cheaper design, and second, because of their easy manufacturing and (less important for engineers, but important to the beneficiaries) for aesthetic reasons. The symmetry in the field of composite materials manifests itself in two different ways, at two levels—one due to the symmetries that appear in the composition of the composite materials and that determine the properties of the materials, and second in the structures manufactured with composites. The study of the obvious importance of the existence of symmetries in the design of composite materials or composite structures of a sandwich type, for example (but also other types), and of the existence of symmetries in structures constructed also using composite materials will be highlighted within this Special Issue. With this Issue, we want to disseminate knowledge among researchers, designers, manufacturers, and users in this exciting field.

Keywords: composites; symmetric structures; sandwich composite; design of composite; advanced materials



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1. Introduction

Composite materials have very different structures and geometries, which lead to interesting properties and various applications in the field of engineering. The properties of composite materials can be special, their price is generally low, they are relatively easy to manufacture, and many of them are made from recyclable materials. As a result, composite materials and composite structures have become widely used in all industries, such as in automotive engineering, aerospace engineering, construction, and manufacturing [1–8]. It is for these reasons that there is continuous research into the development of the field. Some of this research is presented in this volume, in which a large group of researchers will present their latest findings. We hope that researchers will find an interesting and useful volume of information for their future work, but that the results will be also used by engineers for their practical applications.

2. Statistics of the Special Issue

The statistics of papers called for this Special Issue, related to published or rejected items, are as follows [9–24]: 26 total submissions, of which 16 published (61.5%) and 10 rejected (38.5%). The authors' geographical distribution according to the countries of the

authors of the published papers is shown in Table 1, and it can be seen that the 53 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 or more affiliations.

Table 1. Geographic distribution by countries of authors.

Country	Number of Authors
Romania	14
Saudi Arabia	8
Lithuania	9
China	5
Bahrain	1
Turkey	1
Iran	5
Germany	1
Egypt	5
Vietnam	3
Italy	1
Total	53

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 three authors on average per manuscript.

Table 2. Affiliations and bibliometric indicators for authors.

Author	Affiliation	References
Vasile Gheorghe	Transilvania University of Brasov, Romania	[1]
Maria Luminta Scutaru	Transilvania University of Brasov, Romania	[1]
Virgil Barbu Ungureanu	Transilvania University of Brasov, Romania	[1]
Eliza Chircan	Transilvania University of Brasov, Romania	[1]
Arifuzzaman	Department of Civil and Environmental Engineering, College of Engineering, King Faisal University (KFU), Saudi Arabia	[2]
Mohamad Aniq Gul	Department of Civil and Environmental Engineering, College of Engineering, King Faisal University (KFU), Saudi Arabia	[2]
Kaffayatullah Khan	Department of Civil and Environmental Engineering, College of Engineering, King Faisal University (KFU), Saudi Arabia	[2]
S.M. Zakir Hossain	Department of Chemical Engineering, College of Engineering, University of Bahrain, Bahrain	[2]
Zhenhang Zhao	School of Civil Engineering, Southwest Jiaotong University, Chengdu, Key Laboratory of High-Speed Railway Engineering, Ministry of Education, Southwest Jiaotong University, Chengdu, China	[3]
Ying Gao	School of Railway Engineering, Shijiazhuang Institute of Railway Technology, Shijiazhuang, China	[3]
Chenghai Li	School of Civil Engineering, Southwest Jiaotong University, Chengdu, Key Laboratory of High-Speed Railway Engineering, Ministry of Education, Southwest Jiaotong University, Chengdu, China	[3]
Mostafa Katouzian	Department Maschinenwesen, Technical University of Munich, Germany	[4]
Sorin Vlase	Transilvania University of Brasov, Romanian Academy of Technical Sciences, Bucharest, Romania	[4,5,14,16]
Renata Ildiko Szava	Transilvania University of Brasov, Romania	[5]
Ioan Szava	Transilvania University of Brasov, Romania	[5]
Modrea Arina	University of Medicine, Pharmacy, Science and Tehnology George Emil Palade of Tg. Mures, Romania	[5]
Lei Li	Bridge and Tunnel Research Center, Research Institute of Highway Ministry of Transport, Beijing, China	[6]
Ke Lei	Key Laboratory of Urban Underground Engineering of Ministry of Education, Beijing Jiaotong University, Beijing, China	[6]
Ahmed Abouelregal	Department of Mathematics, College of Science and Arts, Jouf University, Al-Qurayyat, Saudi Arabia, Department of Mathematics, Faculty of Science, Mansoura University, Mansoura, Egypt	[7,8]
Marin Marin	Transilvania University of Brasov, Romania	[7,8,11,15,16]
Sayed Abo-Dahab	Department of Mathematics, Faculty of Science, South Valley University, Qena, Egypt	[8]

Table 2. Cont.

Author	Affiliation	References
Sayed Abo-Dahab	Department of Mathematics, Faculty of Science, South Valley University, Qena, Egypt	[8]
Audrius Merfeldas	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Pranas Kuzas	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Darius Gailius	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Zilvinas Nakutis	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Mindaugas Knyve	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Algimantas Valinevicius	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Darius Andriukaitis	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Mindaugas Zilys	Department of Electronics Engineering, Kaunas University of Technology, Kaunas, Lithuania	[9]
Mohammad Reza Mahmoudi	Institute of Research and Development, Duy Tan University, Da Nang, Vietnam	[10]
Mohsen Maleki	Department of Statistics, Faculty of Science, Fasa University, Fasa Iran	[10]
Dumitru Baleanu	Department of Statistics, University of Isfahan, Iran	[10]
Vu-Thanh Nguyen	Cankaya University, Ankara, Turkey	[10,12]
Kim-Hung Pho	Institute of Space Sciences, Bucharest-Magurele, Romania	[10,12]
Faris Alzahrani	University of Economics and Law, Ho Chi Minh City, Vietnam	[10]
Aatef Hobiny	Fractional Calculus, Optimization and Algebra Research Group, Faculty of Mathematics and Statistics, Ton Duc Thang University, Ho Chi Minh City, Vietnam	[10]
Ibrahim Abbas	Nonlinear Analysis and Applied Mathematics Research Group (NAAM), Mathematics Department, King Abdulaziz University, Jeddah, Saudia Arabia	[11]
Ahmed A El-Deeb	Nonlinear Analysis and Applied Mathematics Research Group (NAAM), Mathematics Department, King Abdulaziz University, Jeddah, Saudia Arabia	[11]
Mohammad Jafari	Nonlinear Analysis and Applied Mathematics Research Group (NAAM), Mathematics Department, King Abdulaziz University, Jeddah, Saudia Arabia	[11]
Mohammad Hossein Bayati Chaleshtari	Mathematics Department, Faculty of Science, Sohag University, Sohag, Egypt	[12]
Hamid Abdolalian	Department of Mathematics, Faculty of Science, Al-Azhar University, Nasr City, Egypt	[12]
Eduard Marius Craciun	School of Mechanical Engineering, Shahrood University of Technology, Shahrood, Iran	[13]
Luciano Feo	School of Mechanical Engineering, Iran University of Science and Technology, Narmak, Tehran, Iran	[13]
Mircea Mihalcica	School of Mechanical Engineering, Shahrood University of Technology, Shahrood, Iran	[13]
Marina Domnica Stanciu	Faculty of Mechanical, Industrial and Maritime Engineering, Ovidius University of Constanta, Romania	[13,16]
Tareq Saeed	Department of Civil Engineering, University of Salerno, Italy	[13]
Ibrahim Abbas	Transilvania University of Brasov, Romania	[14]
	Transilvania University of Brasov, Romania	[14]
	Nonlinear Analysis and Applied Mathematics Research Group (NAAM), Mathematics Department, King Abdulaziz University, Jeddah, Saudi Arabia	[15]
	Nonlinear Analysis and Applied Mathematics Research Group (NAAM), Mathematics Department, King Abdulaziz University, Jeddah, Saudi Arabia	[15,16]
	Mathematics Department, Faculty of Science, Sohag University, Sohag Egypt	[15,16]

4. Brief Overview of the Contributions to the Special Issue

The analysis of the topics identifies or summarizes the research undertaken. This section classifies the manuscripts according to the topics proposed in the Special Issue. There are three topics that are dominant, namely: symmetry in mechanical engineering, symmetry in applied mathematics, and symmetry in civil engineering.

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