



Serbian Tribology Society



Faculty of Engineering  
University of Kragujevac

# SERBIATRIB '17

**15<sup>th</sup> International Conference on Tribology**

17 – 19 May 2017, Kragujevac, Serbia

## PROGRAM



SERBIATRIB '17



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Faculty of Engineering

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## PROCEEDINGS

EDITOR: Slobodan Mitrović



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# 15<sup>th</sup> International Conference on Tribology – SERBIATRIB '17 PROCEEDINGS

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## POSSIBILITIES OF ARTIFICIAL NEURAL NETWORK APPLICATION IN BIOTRIBOLOGICAL RESEARCH

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**Abstract:** A tribological system is a complex non-linear system composed of the elements that are connected structurally and functionally. Tribomechanical system structure is made of elements, characteristics of elements and interaction of these elements. Function of tribomechanical system is the transformation of inputs into the technical output. The aim of this paper is to present an overview of artificial neural networks, its development and possible applications of neural networks in the analysis of the results values of certain parameters in tribological related research. The possibility of artificial neural networks application to solve complex nonlinear problems and to identify bio-tribological characteristics of ceramic materials in terms of abrasion resistance and coefficient of friction is presented.

**Keywords:** tribological characteristics, prediction, neural networks, mathematical modelling

### 1. INTRODUCTION

Application of ANNs became wider in last few decades, especially in different areas of production engineering. Hence, in tribological experiments, application of ANNs models for prediction of tribological properties values become more present, i.e. for wear rate and friction coefficient, according to the defined terms of the contact, for materials that are tested. Neural networks have been used for prediction of short fibre composites tribological properties [1], for prediction of carbon fiber and TiO<sub>2</sub> composites properties [2], plasma nitrided 316L stainless steel tribological properties [3], for prediction of composite PEEK-CF30 tribological behavior [4], etc.

Particular attention of researchers in recent years was occupied by bio-tribology. Bio-tribology is one of the current and rapidly growing field of tribology. The diversity of research activities in bio-tribology is very large and includes many scientific fields. A large number of papers in various fields of bio-tribology from year to year are published in numerous prestigious scientific journals [5]. A very important area in recent years that is the focus of numerous studies is the field of research and development of new biomaterials. The term biomaterial, refers to materials with such unique characteristics which make them particularly suitable for close contact with the living tissue, and whose production process is often applied, or mimics a biological phenomenon [6]. New