Title: Advanced analytical and numerical methods for analysis of functionally graded micro/nanostructures

Description: Bilateral project between China and Serbia, mobility program

Dates: January 2018-December 2019

Project number: 4-2

Partner institutions:

- Department of Engineering Mechanics, College of Mechanics and Materials, Hohai University, Nanjing, China
- Mathematical institute of the Serbian Academy of Sciences and Arts, Belgrade, Serbia

Chinese team:

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Project outline:

Functionally graded (FG) materials are composed of at last two-phase inhomogeneous particulate composite such that volume fractions of the constituents vary continuously along any desired spatial direction. Dynamic and wave propagation analysis of FG micro/nanostructures using continuum-based models has become an important topic of investigation among the scientists, especially due to difficulties arising in experimental and atomistic simulation approaches. The aim of this collaboration is to develop improved fractional order nonlocal models for the dynamic and wave propagation analysis of various FG micro/nanostructures. The novelty of the suggested approach resides in the fact that dissipation and size effects in FG micro/nanostructures are taken into account by using the comparisons of both, the nonlocal elasticity and fractional viscoelasticity theory. It is planned to employ contemporary analytical and meshless numerical methods and approaches to find and verify the solutions of obtained fractional order governing equations. Another objective is the development of optimal fractional order controllers for systems based on smart FG micro/nanostructures. It is expected that the results of this project will contribute to future design procedures of complex micro/nano-electromechanical systems and devices for application in biomedicine, aerospace and automotive industry.