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PREFACE

The second issue of the volume 5 of the *Romanian Journal of Mechanics* is devoted to up-and-coming tendencies in geometry, mechanics and the robotic control.

The connection between the geometry and mechanics has roots extending deep into the history of sciences. In his discourse for Encyclopedie, Jean Le Rond d'Alembert distinguished between the pure mathematics (geometry, algebra, calculus, arithmetic) and mixed mathematics (mechanics, geometric mechanics, astronomy, optics). This connection covers a wide variety of research topics from differential geometry to algebra, from variational calculus to geometric mechanics, from the symmetries and conservation laws of differential equations to the pseudo-Riemannian geometry of homogeneous spaces.

The modified spring mass structure able to broaden the bandwidth and enhance attenuation at the low frequency region is investigated in the paper no.1. The effects of elastic foundation of the mass spring structures is also treated. As a result, a cut off frequency is generated before propagation of wave occur in the system.

A powerful control tool about the robots is the differential dynamic logic dL. With dL, an accurate model for hybrid systems is presented in the paper no.2. The paper analysed the process of exploring the capabilities of serial robots is analysed in the presence of gravity and friction.

Paper no.3 presents the cnoidal method, a suitable method to solve the Ricci equation. Some properties of the linear and nonlinear waves are also reported. The study of Ricci solitons is related to the study of other faimos equations (KdV, sine-Gordon, Klein–Gordon, Schrödinger, Weierstrass, Burgers equations) and also to the Tzitzeica surface and Tzitzeica equation which have an essential influence on the topology of the Riemannian manifold and also to the influence on its geometry.

Ceva's and Menelaus's theorems from the projective geometry are interpreted in the paper 4 as cyclic structures on an orientable manifold, playing the roles of basic cells for building other complex theorems.

The last paper of this issue is concerned with the small amplitude oscillations in initially deformed elastic metallic bilayers. The variation of sound speeds with initial strain and the measured magnitude of the acousto-elastic effect are used to determine the biaxial modulus and the elastic constants for a deformation in the [111] direction. The numerical results shown that the foils containing short-wavelength compositions modulations has an enhanced biaxial modulus Y[111] both for Au-Ni and Cu-Pd.

We are grateful to reviewers for the time and effort they spent evaluating the papers. We believe that this issue will be a valuable contribution to the field of mechanics and robotics, and a source for further development and scientific discussion within computational aspects in mechanics, robotics and geometry.

Editors