

## BIOMECHANICS AND APPLIED DYNAMICS

JOSEP M. FONT-LLAGUNES<sup>\*</sup>, JÓZSEF KÖVECSES<sup>†</sup>

<sup>\*</sup> Department of Mechanical Engineering and Biomedical Engineering Research Centre  
Universitat Politècnica de Catalunya  
Diagonal 647, 08028 Barcelona, Catalunya, Spain  
Email: josep.m.font@upc.edu, url: <http://www.creb.upc.edu>

<sup>†</sup> Department of Mechanical Engineering and Centre for Intelligent Machines  
McGill University  
817 Sherbrooke Street West, H3A 2K6 Montreal, Quebec, Canada  
Email: [jozsef.kovecses@mcgill.ca](mailto:jozsef.kovecses@mcgill.ca), url: <http://www.cim.mcgill.ca/~adyn>

**Key words:** Applied dynamics, Biomechanics, Human motion analysis.

### ABSTRACT

Biomechanics is a challenging and interdisciplinary research topic that requires the collaboration of physicians, biologists and mechanical engineers. In recent years, significant research effort has been devoted by the mechanics community to the analysis and prediction of human body motion for different applications (clinics, rehabilitation, sport, etc.). The objective of this minisymposium is to bring together researchers from the clinical and engineering fields to discuss about topics related to the use of theoretical and applied mechanics concepts to human motion analysis.

The minisymposium will address different scientific topics related to the modelling and biomechanical analysis of human motion. The contents of the minisymposium are the following:

- Development of realistic musculoskeletal models for biomechanical studies.
- Data acquisition and signal processing of kinematic and kinetic measurements.
- Modelling of anatomical joints, ligaments, soft tissues and muscles.
- Inverse dynamic analysis and human motion prediction.
- Contact and impact analysis in different modes of locomotion.
- Contact force modelling, both between adjacent body segments and between the body and the environment.
- Muscle mechanics and solution of redundancy in muscle actuation (muscle force sharing problem) in inverse and forward dynamics.
- Analysis of powered assisted gait and rehabilitation devices.
- Energetics of human motion.
- Applications of human motion analysis.

It is expected that this minisymposium will be an opportunity for mechanical engineers and clinicians to cooperate and discuss on how to improve the present state-of-the-art research. Physicians and clinicians can improve their techniques by using more detailed models, which can serve in turn to reduce the time invested in experimental research. On the other hand, mechanists can get good suggestions for new research activities, applications and modelling techniques.