

# Criteria of benchmark selection for efficient flexible multibody system formalisms

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Received 20 September 2007; received in revised form 3 October 2007

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## Abstract

The paper deals with the selection process of benchmarks for testing and comparing efficient flexible multibody formalisms. The existing benchmarks are briefly summarized. The purposes for benchmark selection are investigated. The result of this analysis is the formulation of the criteria of benchmark selection for flexible multibody formalisms. Based on them the initial set of suitable benchmarks is described. Besides that the evaluation measures are revised and extended.

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*Keywords:* benchmark, flexible multibody system, efficient multibody formalism

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## 1. Introduction

Dynamic simulation of multibody systems (MBS), especially more of flexible multibody systems (FMBS) is very important not only for solving dynamics of traditional mechanical systems, but even more for investigation of mechatronic systems where MBS is usually the kernel of the model. Precise, reliable and efficient computer simulation of FMBS is the basis for their optimized design and for the design of suitable control system.

Standardized problems, so called benchmarks, of MBS and FMBS are of great interests for the development of new advanced formulation and simulation techniques. The new methods must be compared with the previous ones regarding many features. The compared property of different formulations and implementations is usually the computational efficiency resulting into the ultimate CPU time necessary for the simulation of particular benchmark problem. The other important properties to be compared are discussed later.

A certain set of benchmarks for MBS and some FMBS simulation has been proposed and defined in the past. However, the new developments of flexible multibody system formalisms and the new developments of multibody formalisms for usage on parallel processors require to develop suitable set of benchmarks and suitable methods of their comparisons.

In this paper it is described the way of selection of benchmarks for testing and comparing efficient flexible multibody formalisms with respect to their parallelization. The paper is organized as follows. The section 2 deals with the overview of existing MBS benchmarks. The description of the suitable comparison criteria that are used for the benchmark selection is provided in section 3. The proposed list of suitable benchmarks is the content of section 4. Finally the conclusion is in section 5.

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