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A second order extension of the generalized-α method for constrained systems in mechanics. (English) Zbl 1303.70004

Bottasso, Carlo L. (ed.), Multibody dynamics. Computational methods and applications. Revised, extented and selected papers of the ECCOMAS thematic conference on multibody dynamics 2007, Milano, Italy, June 25–28, 2007. Dordrecht: Springer (ISBN 978-1-4020-8828-5/hbk). Computational Methods in Applied Sciences (Springer) 12, 143-158 (2009).

Summary: We present a new second order extension of the generalized-α method of *J. Chung* and *G. M. Hulbert* [J. Appl. Mech. 60, No. 2, 371–375 (1993; Zbl 0775.73337)] for systems in mechanics having nonconstant mass matrix, holonomic constraints, and/or nonholonomic constraints. Such systems are frequently encountered in multibody dynamics. For variable step-sizes, a new adjusting formula preserving the second order of the method is proposed.

For the entire collection see [Zbl 1149.70002].

MSC:

70-08 Computational methods for problems pertaining to mechanics of particles and systems
70F20 Holonomic systems related to the dynamics of a system of particles
70F25 Nonholonomic systems related to the dynamics of a system of particles
70E55 Dynamics of multibody systems

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