

Hybrid Simulation of Complex Structural Systems Based on Partitioned Time Integration Schemes.

Giuseppe Abbiati^{*}, Enrico Cazzador[†], Oreste S. Bursi[†], Pierre Pegon[~], Francisco Javier Molina[~] and Fabrizio Paolacci[§].

^{*} Department of Civil, Environmental and Geomatic Engineering (D-BAUG), IBK, ETH Zurich
Stefano-Franscini-Platz 5, 8093 Zürich, Switzerland
e-mail: abbiati@ibk.baug.ethz.ch

[†] Department of Civil, Environmental and Mechanical Engineering, University of Trento
Via Mesiano 77, 38123, Trento, Italy
e-mail: oreste.bursi@unitn.it, enrico.cazzador@unitn.it

[§] Department of Engineering, University of Roma Tre
Via Vito Volterra 62, Rome, Italy
e-mail: fabrizio.paolacci@uniroma3.it

[~]European Commission, Joint Research Centre (JRC), Institute for the Protection and Security of the Citizen, European Laboratory for Structural Assessment Unit, Via Enrico Fermi 2749, 21027 Ispra (VA), Italy
e-mail: pierre.pegon@jrc.ec.europa.eu

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ABSTRACT

In the last two decades, the increasing complexity of engineering systems boosted the development of very efficient simulation methods based on partitioning. In view of coupling dynamic parts of hybrid systems, the finite element tearing and interconnecting approach emerged as the most promising technique. Nonetheless, there is still a lack of a comprehensive study of algorithmic performances from the experimental perspective. In this view, the present paper sheds light on the application of two well-known parallel partitioning methods for the purpose of the simulation of hybrid models. Thus, an existent reinforced concrete bridge is chosen as a benchmark case study. In order to perform hybrid simulations, a novel coupling software was devised. It allowed for combining two physical piers to the numerical model of the remaining part of the bridge. As a result, successful tests were conducted at the ELSA laboratory of the Joint Research Centre of Ispra (Italy).