Advances in Nonlinear/Linear Computational Dynamics: The Concept of Algorithms By Design

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Abstract

Some novel advances fostering the notion and concept of Algorithms By Design for applications to transient dynamics of nonlinear/linear problems will be presented. Unlike the traditional paradigm and school of thought that has been customarily used for developing computational algorithms, the present developments offer new concepts and perspectives to design computational algorithms based on the wish-list of the analyst. A unified theory emanating from a time weighted residual approach first provides the classification of computational algorithms into the so-called Types 1, 2, and 3 classifications. Subsequently, measures for computational algorithms which are categorized into primary and secondary measures provide a forum that establish standardized metrics for comparing computational algorithms. Finally, based on the given wish list of the analyst, recommended options and directions are provided to tailor the design to suit the needs of the problem at hand. Sevceral illustrative applications of the concepts will be presented.

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