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**Analysis of the dynamics of rigid blocks using the theory of distributions** (Conference Paper)

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Abstract

The paper aims at providing an original fully distributional approach for the description of the pure rocking motion of a unilateral rigid system undergoing a dynamic excitation. Impulsive and dipolar terms arise in the dynamic equations, which do not seem to alter the piecewise well known solutions. It is proved in the paper that the addition of a null distribution to the original expression of the displacements, produces non-null effects on the response of the system, with the impact obeying to a strongly non-linear equation. It is thus confirmed that rocking block dynamics is a very delicate topic to be treated by numerical analyses. © 2011 Civil-Comp Ltd and Elsevier Ltd. All rights reserved.

Author keywords

Alfa-functions; Dirac distribution; Distributional approach; Rocking motion; Structural dynamics; Unilateral model

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Keywords

Rocking motion; Unilateral model; Distributional approach; Dirac distribution; Alfa-functions; Structural dynamics

1. Introduction

The rocking response and the possibility of overturning of rigid bodies during earthquakes represent important features in some seismic safety problems. The reason for the interest in treating dynamics of rigid blocks [1], [2], [3], [4], [5], [6], [7] and [8] is mainly due to possible applications: a broadly similar response is actually exhibited, during earthquakes, by ancient stone temples and sculptures saved in museums or in archaeological open spaces, as well as in a variety of other cases, for

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