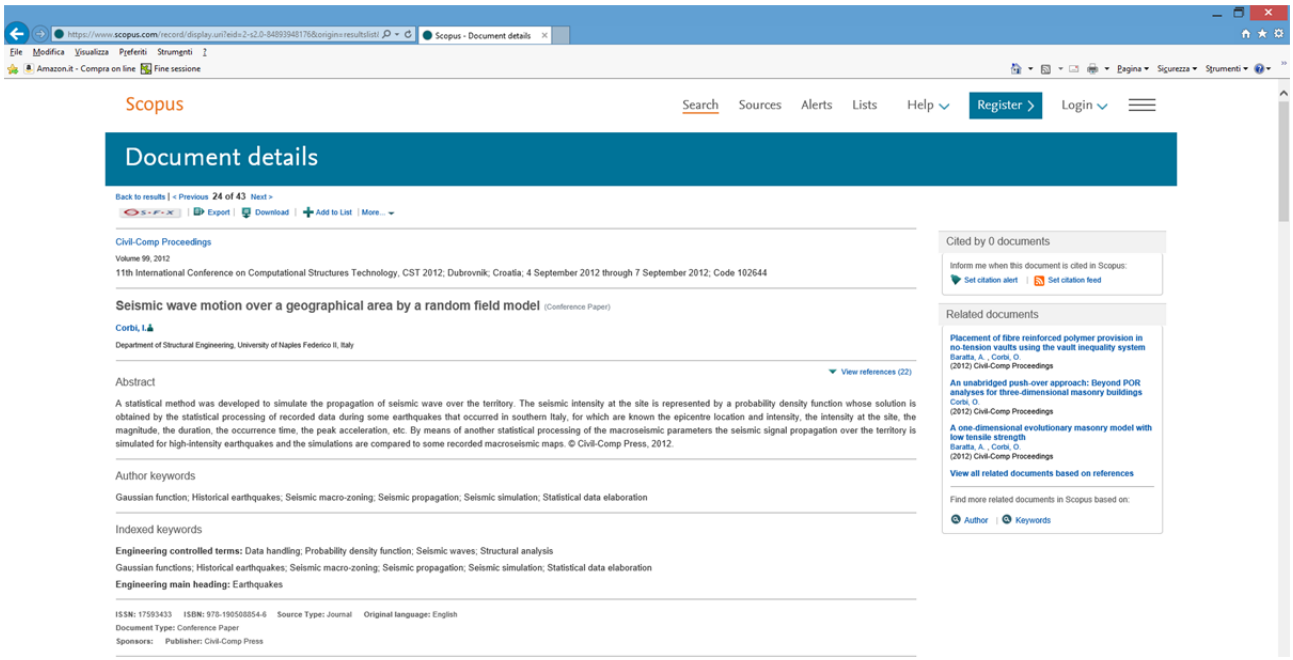

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Civil-Comp Proceedings

Volume 99, 2012

11th International Conference on Computational Structures Technology, CST 2012; Dubrovnik; Croatia; 4 September 2012 through 7 September 2012; Code 102644

Seismic wave motion over a geographical area by a random field model (Conference Paper)

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Abstract

A statistical method was developed to simulate the propagation of seismic wave over the territory. The seismic intensity at the site is represented by a probability density function whose solution is obtained by the statistical processing of recorded data during some earthquakes that occurred in southern Italy, for which are known the epicentre location and intensity, the intensity at the site, the magnitude, the duration, the occurrence time, the peak acceleration, etc. By means of another statistical processing of the macroseismic parameters the seismic signal propagation over the territory is simulated for high-intensity earthquakes and the simulations are compared to some recorded macroseismic maps. © Civil-Comp Press, 2012.

Author keywords

Gaussian function; Historical earthquakes; Seismic macro-zoning; Seismic propagation; Seismic simulation; Statistical data elaboration

Indexed keywords

Engineering controlled terms: Data handling; Probability density function; Seismic waves; Structural analysis

Gaussian functions; Historical earthquakes; Seismic macro-zoning; Seismic propagation; Seismic simulation; Statistical data elaboration

Engineering main heading: Earthquakes

ISSN: 17593433 ISBN: 978-190508854-6 Source Type: Journal Original language: English

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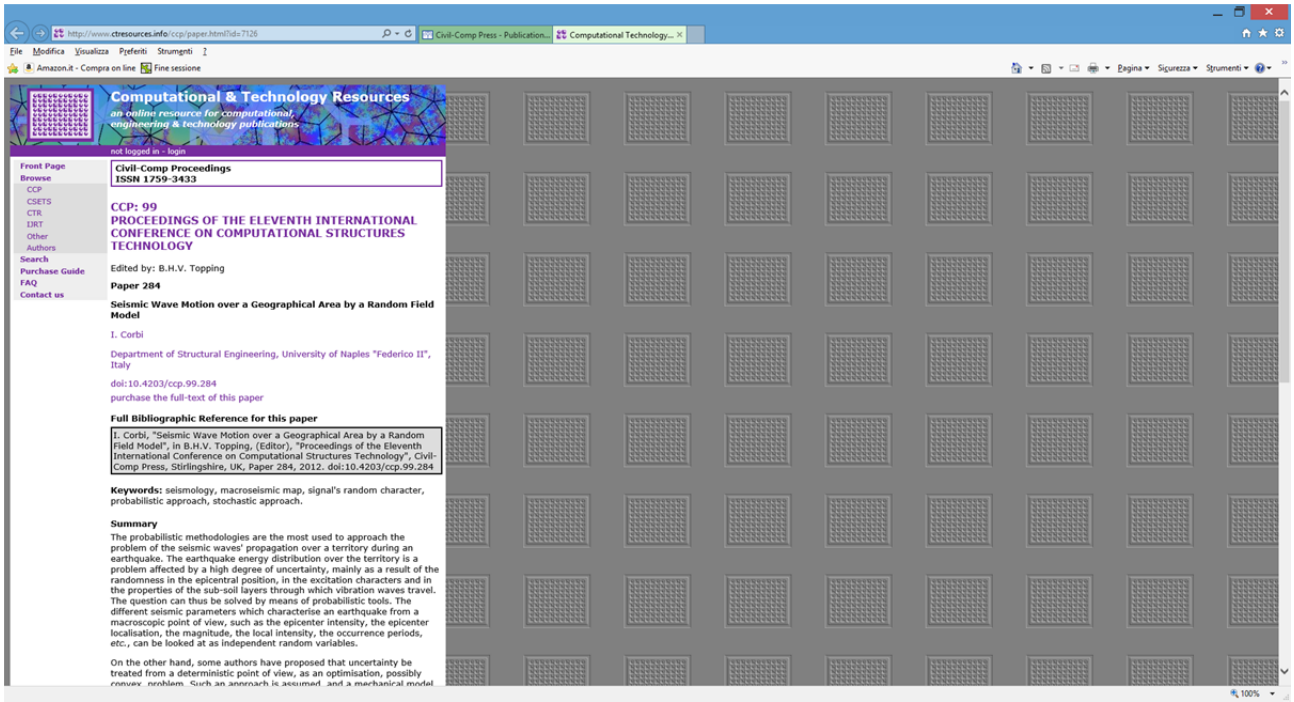

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Civil-Comp Proceedings
ISSN 1759-3433

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Edited by: B.H.V. Topping

Paper 284

Seismic Wave Motion over a Geographical Area by a Random Field Model

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doi:10.4203/ccp.99.284

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I. Corbi, "Seismic Wave Motion over a Geographical Area by a Random Field Model", in B.H.V. Topping, (Editor), "Proceedings of the Eleventh International Conference on Computational Structures Technology", Civil-Comp Press, Stirlingshire, UK, Paper 284, 2012. doi:10.4203/ccp.99.284

Keywords: seismology, macroseismic map, signal's random character, probabilistic approach, stochastic approach.

Summary

The probabilistic methodologies are the most used to approach the problem of the seismic waves' propagation over a territory during an earthquake. The earthquake energy distribution over the territory is a problem affected by a high degree of uncertainty, mainly as a result of the randomness in the epicentral position, in the excitation characters and in the properties of the sub-soil layers through which vibration waves travel. The question can thus be solved by means of probabilistic tools. The different seismic parameters which characterise an earthquake from a macroscopic point of view, such as the epicenter intensity, the epicenter localisation, the magnitude, the local intensity, the occurrence periods, *etc.*, can be looked at as independent random variables.

On the other hand, some authors have proposed that uncertainty be treated from a deterministic point of view, as an optimisation, possibly convex, problem. Such an approach is assumed, and a mechanical model