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## Benchmark Tests for Strong Ground Motion Simulations (Part 9: Theoretical Methods, Step 5 & 6)

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We have been conducting a series of benchmark tests of the strong motion simulation methods for three years since 2009. We chose the three most popular methods for this purpose: the theoretical methods (the wavenumber integration method, the discrete wavenumber method, and the thin-element method), the stochastic Green function method, and the numerical methods (the finite difference method and the finite element method). In this presentation (Part 9), we show the results of the theoretical methods for flat-layered structures in the step 5 and 6, and subsequent papers (Part 10) and (Part 11) show the results for numerical and empirical methods, respectively.

Show table 1, this table is list of Benchmark tests for the 2011 theoretical method (step 5 and 6). The step 5 and 6 use the Kanto sedimentary basin for the actual seismic sources (e.g., the 1990 West Kanagawa earthquake (M5.1) for step 5, and the 1923 Kanto earthquake (M7.9) for step 6). We selected 19 calculation points at the Kanto sedimentary basin from AIJ strong ground motion data sets, as shown figure 1. Structure models are flat-layered structures that extracted every 19 calculation points from 3D structure models.

All the results using various methods (the wavenumber integration method, the discrete wavenumber method, and the thinlayer method) generally show good agreements, as long as we use the same source and structure models. As compared with the observed records, those results generally simulate the body waves very well, but not the basin-induced surface waves.

Please check the following web site for more details. http://kouzou.cc.kogakuin.ac.jp/benchmark/index.htm

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Keywords: Strong Ground Motion Simulations, Benchmark Test, Theoretical Methods, Wavenumber Integration Method, Discrete Wavenumber Method, Thin Layer Method

