

A Study on Nonlinear Earthquake Response Analyses Using Time Domain Energy Transmitting Boundary

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SUMMARY

The energy-transmitting boundary, which is a technique used in the well known FEM program FLUSH [Lysmer, J., et al., RRDC Report, 1975], is a quite efficient technique for the earthquake response analysis of buildings considering soil-structure interaction. However, it is applicable only in the frequency domain. The author has proposed methods for transforming frequency dependent impedance into the time domain [Nakamura, N., EE&SD, 2006].

In this paper, a nonlinear earthquake response analysis method for a soil-structure interaction system by finite element models using the energy-transmitting boundary in the time domain, was proposed. First, the transform of the transmitting boundary matrices to the time domain using the proposed transform method was studied. Then, time history earthquake response analyses using the boundary were performed. Through these studies, the validity and efficiency of the proposed methods were confirmed.

References

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- [2] N. Nakamura, "Improved Methods to Transform Frequency Dependent Complex Stiffness to Time Domain", *Earthquake Engineering and Structural Dynamics*, 35, 1037-1050, 2006