

ID: 1.1.1e

Title: Estimation of Ground Behavior Using Kalman Filter Finite Element Method

Name: Nakatani, Masahide

Affiliation: Department of Civil Engineering, Chuo University

The purpose of this study is to investigate estimation of acceleration of the ground using the Kalman filter finite element method. From data of acceleration observed in the site, arbitrary data of acceleration is estimated. In this paper, as the state equation, the equilibrium of stress equation, the strain - displacement equation, and the stress - strain equation are used. For spatial discretization, the finite element method and the Galerkin method is used as an interpolation method. For temporal discretization, the Newmark  $\beta$  method is applied. the Kalman filter finite element method is the combination of the Kalman filter and the finite element method. This method can estimate from noisy observation in the site. However, long computational time is required for computation by the method. As the numerical study, this method is applied to quarry on Futatsuishi dam construction site. The site is located in Miyagi prefecture, Japan. The blasting examination was carried out on July 27th, 2006. Then accelerations are measured at two points by the accelerometer. These obtained data are used as observation and reference data. The acceleration is estimated by the presented method using observation data. The estimation value is compared with reference data at estimation point.