

## عنوان مقاله:

EXTRACTION OF STIFFNESS SUBMATRIX OF SHEAR AND NON-SHEAR BUILDINGS WITH LOCAL MEASUREMENT UNDER BASE EXCITATION

## محل انتشار:

هشتمین کنفرانس بین المللی زلزله شناسی و مهندسی زلزله (سال: 1398)

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## نویسندگان:

Rasoul KHODAYARI - *Department of Civil Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran*

Omid BAHAR - *Assistant Professor, Structural Engineering Research Center, IIEES, Tehran, Iran*

## خلاصه مقاله:

Vibration Based System Identification (VB-SI) as a powerful tool to disclosure a mathematical expression of dynamic behavior of structures has been extensively studied in recent years for structural damage assessment. Among developed strategies of VB-SI for extracting system dynamic characteristics, output-only methods are becoming more and more popular due to the clear advantages of the technology: There is no need to the complex excitation tools, the technology is applicable to a wide range of structures and performing the test approach is much easier, and also of a great importance is the structure remains under its operating condition during the test (Priori et al., 2018). Knowing the real floor stiffness of a structure, especially when the structure is old, has a great important for evaluation of its performance against future environmental excitations, control, strengthening and/or rehabilitation. This task via performing vibration testing, in order to estimating modal parameters beside floor stiffness is the primary objective of damage detection field of study. In some damage detection cases, instead of extracting the whole matrices of the structure, identifying characteristics of an only part of the stiffness matrix may be a great help. On the other hand, regarding to the large dimension of a structure and also due to impossibility of recording all DoFs, only a few DoFs of the structure will be inevitably measured, which is called incomplete measurement. This certainly leads to spatially incomplete mode shapes and often nonunique identification results. Incomplete measurement has two general categories; the first one includes DoFs without mass or mass moment of inertia like all rotational DoFs, which are never measured, at all. However, the second one: in many real cases like sheartype buildings, because some practical limitations we may eliminate that the response of some floors to be measured. In these cases, the extracted mode shapes and also determined structural matrices have less dimension with respect to the concern complete ones. This paper focuses on presenting a method to extract local stiffness submatrix in shear & nonshear buildings using incomplete output-only noisy structural responses. The suggested method is based on the structural dynamics and the realization theory, which is the base of the Stochastic Subspace Identification (SSI) method. According to the realization theory and minimal realization principal, only that realizations are the solution of an inverse problem that is ... not to be divisible into submatrices. In better word

## کلمات کلیدی:

System identification, Stiffness submatrix, Minimal realization, Base excitation, Incomplete measurement

## لینک ثابت مقاله در پایگاه سیویلیکا:

