Identifying Unknown Dynamic Forces Applied on Two Dimensional Frames

Authors : H. Katkhuda

Abstract : A time domain approach is used in this paper to identify unknown dynamic forces applied on two dimensional frames using the measured dynamic structural responses for a sub-structure in the two dimensional frame. In this paper a sub-structure finite element model with short length of measurement from only three or four accelerometers is required, and an iterative least-square algorithm is used to identify the unknown dynamic force applied on the structure. Validity of the method is demonstrated with numerical examples using noise-free and noise-contaminated structural responses. Both harmonic and impulsive forces are studied. The results show that the proposed approach can identify unknown dynamic forces within very limited iterations with high accuracy and shows its robustness even noise- polluted dynamic response measurements are utilized.