The Estimation Method of Inter-Story Drift for Buildings Based on Evolutionary Learning

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Abstract : The seismic responses-based structural health monitoring system has been performed to reduce seismic damage. The inter-story drift ratio which is the major index of the seismic capacity assessment is employed for estimating the seismic damage of buildings. Meanwhile, seismic response analysis to estimate the structural responses of building demands significantly high computational cost due to increasing number of high-rise and large buildings. To estimate the inter-story drift ratio of buildings from the earthquake efficiently, this paper suggests the estimation method of inter-story drift for buildings using an artificial neural network (ANN). In the method, the radial basis function neural network (RBFNN) is integrated with optimization algorithm to optimize the variable through evolutionary learning that refers to evolutionary radial basis function neural network (ERBFNN). The estimation method estimates the inter-story drift without seismic response analysis when the new earthquakes are subjected to buildings. The effectiveness of the estimation method is verified through a simulation using multi-degree of freedom system.