

عنوان مقاله:

Development of a Neural-Autoregressive Model for Time History Analysis of an Arch Dam-Reservoir System

محل انتشار:

دهمین کنگره بین المللی مهندسی عمران (سال: 1394)

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خلاصه مقاله:

Time history analysis of arch dams using numerical methods such as finite element analysis is a complicated and time consuming procedure. Such analysis can be more complicated when it is needed to take the effect of reservoir interaction into account. In this study a nonlinear autoregressive with exogenous inputs (NARX) neural network (NN) which is called NARX-NN is used for modeling the seismic behavior of an arch dam. The Karun IV arch dam-reservoir system is selected for numerical and neural modeling. To develop a proper NARX-NN model, first, the arch dam-reservoir system is numerically analyzed under a special excitation by finite element analysis for collecting the required data to be used in the training phase of the neural modeling. Then the trained neural model is used to verify with new inputs i.e. real accelerations. The verification outputs of the neural model which are the responses of the arch dam body are compared with those obtained from the numerical analysis. The obtained results indicate good agreement between proposed model and finite element model outputs. The main advantages of the proposed method are the time of the analysis which can be significantly reduced and the acceptable precision in the modeling results.

کلمات کلیدی:

Time history analysis, NARX neural network, Dam-reservoir system, Karun IV arch dam

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