

## عنوان مقاله:

Finite element model updating of a geared rotor system using particle swarm optimization for condition monitoring

## محل انتشار:

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## خلاصه مقاله:

In this paper, condition monitoring of a geared rotor system using finite element (FE) model updating and particle swarm optimization (PSO) method is considered. For this purpose, employing experimental data from the geared rotor system, an updated FE model is obtained. The geared rotor system under study consists of two shafts, four bearings, and two gears. To get the experimental data, piezoelectric accelerometers are mounted on the bearings to extract the natural frequencies. Also, mass, stiffness and gyroscopic matrices can be obtained using FE method. By extracting these matrices, natural frequencies and mode shapes are also obtained from solutions of an eigenvalue problem. Having the first flexural four natural frequencies from experimental modal analysis as the objective, FE model of the geared rotor structure is to be updated. Solving sensitivity equations iteratively, model updating is performed to predict the required changes in parameters of the model. In the next stage, some defects are introduced into the experimental setup and the resulting natural frequencies are set as the reference for model updating purpose. Therefore, the changes in the model parameter with respect to a healthy system is monitored. Using PSO method, fault detection in a geared rotor system is performed. Model updating and PSO are able to predict the types and values of damages created in the geared rotor system. In general, the model updating method is simpler and computationally more efficient for industrial equipment. However, particle swarm optimization provides more accurate results with higher computations.

## کلمات کلیدی:

Model updating, damage detection, Condition monitoring, finite element method, Particle Swarm Optimization

## لینک ثابت مقاله در پایگاه سیویلیکا:

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