Abstract

Structural health monitoring in the form of a bridge is important to determine the health of the bridge to anticipate damage to the structure. With monitoring on the bridge, it can provide a lot of information and solve problems with the bridge structure performance in general. This paper presents a two-stage diagnosis, detecting damage to the bridge and finding the location of the damage to the bridge. The model (ARIMA) is mounted on a series of Accelerometer signals or vibrations recorded by the sensor. In the first stage, the ARIMA1 model is applied as a safe indicator, then the ARIMA2 model is applied as a new damage indicator so that it can define as the distance between the ARIMA1 and ARIMA2 models to determine the presence of damage to the structure. In the second stage, determine the location of the damage by comparing the distance between the ARIMA1 model and the ARIMA2 model than adding classifications to the two models to obtain an indicator of the location of the damage to the structure. The results show that the ARIMA algorithm can identify the damage and the location of the damage, from the bridge structure using a comparison scenario of the normal and damaged bridge structure conditions, the identification of the damage and the location of the damage comes from the average MAPE value of each ARIMA model, where according to the scenario of damage to the first spring it affects the first sensor to the fourth sensor. From the calculation of the percentage of all sensor from the scenario of damage to spring one, the results of the calculation of damage from each scenario include the damaged bridge structure scenario with an empty load of 12% and the full load bridge structure scenario of 13%.

Keywords: Bridge, ARIMA, Demage Detection, Structural healt monitoring system