

VECTOR-BASED 3D METHOD FOR FAULT DETECTION OF LARGE TURBOMACHINERY

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The paper presents extension of the Operational Envelope method, focused on fault detection of large turbogenerators. The method now uses complete information about amplitudes and phases of vibration data during transient operating states. This is the richest data source for machinery diagnostics, but automated analysis of long sets of 3D vectors is much more complex than amplitudes only. Key functionality of the method is automated calculation of the 3D Operational Envelope, based on the healthy data and proposal of estimator for calculation of multidimensional “distance”. The new distance operator yields number which can be used to automatically assess how far away the currently measured turbine data from the reference data set are. The method is augmented by a new tool for visualization of long 3D vectors to help quick visual assessment. The new Extended 3D Operational Envelope method is a very convenient tool for first line automated diagnostics of large turbo generators and can be of a great help in modern machinery maintenance plans.

Keywords: turbo generator, vibration, automated, fault detection, combined amplitude-phase analysis