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PREDICTION OF DYNAMIC PRESSURE MEASUREMENT IN A LIQUID ROCKET ENGINE USING CHAMBER PRESSURE AS PREDICTOR USING ARTIFICIAL INTELLIGENCE.

Abstract

The Liquid engine testing is carried out in three phases namely the development testing, the acceptance testing and the qualification testing. Considering the lineage of the testing of certain Liquid Engines in India, it is proposed to use AI/ML tools of MATLAB to predict the test Engine parameters using Regression models. The Test Article measurement system comprises of process measurements namely pressure, temperature, strain, speed, and vibration. In the Principal Test Stand an Integrated Data Acquisition System (IDAS) acquires all the process parameters of the Liquid Rocket Engine data at 2000 samples per second and the Vibration Measurements are acquired at high sampling rates of 50000 Samples per second in a High-Speed Data Acquisition system (HDAS). The induction of the IDAS was pivotal in ensuring accurate and precise measurements required in the Human Rated Liquid Engine ground testing. In this paper the regression models are developed for the prediction of dynamic Pressure Measurement (PFIQ) using the Chamber Pressure (PF) as the predictor. Since the two measurements are of two different sampling rates, the sampling rate of dynamic pressure measurement is reduced to 2000 samples per second using the decimate function in MATLAB. The future scope of the paper is creating an application to predict the dynamic pressure of any liquid engine using the chamber pressure. Prediction of Dynamic Pressure Measurement in a Liquid Rocket Engine Using Chamber Pressure as Predictor using Artificial Intelligence. Predictive data analytics is the art of building and using models that make predictions based on patterns extracted from historical data.