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EXPLORING BEARING ROOT MEAN SQUARE FIRST PASSAGE TIME BASED ON INVERSE GAUSSIAN DISTRIBUTION

Abstract:

Bearing becomes a critical rotational component in mechanical system, and its condition will affect the system. It is essential to predict bearing lifetime through acquisition and process degradation prediction. Vibration data contain information bearing degradation, and analysis based on this information is frequently applied in bearing prognostic. Proper models should be developed in order to find the relationship between degradation process and covariates. First passage time is a critical parameter in Brownian motion representing the time point when degradation curve passes through the failure for the first time, which equals to lifetime of the bearing. It is a random process that follows the inverse Gaussian distribution. This paper explores the application of first passage time of bearing vibration using bearing lifetime and operating condition as covariate. The lifetime data is extracted from bearing vibration data PHM Pronostia FEMTO database. The research methodology consist of inverse Gaussian parameter estimation, and interpretation of reliability of first passage analysis of operating condition.

Keywords:

bearing lifetime, estimation inverse Gaussian, bearing operating condition, reliability first passage time

JEL Classification: C00, C80