

Scholarship Skills, Winter 2006

Exercise 5 – Revise Paragraph(s)

Jan 24, 2006 due Jan 26, 2006

Read – Dupré Segments 1, 2, 15, 17, 24, 27, 34, 37, 38, 41, 43, 47, 49, 65, 77, 93, 96, 118, 126

Revise the following paragraph(s) using the Core Rules.

It is investigated whether or not tri-axial accelerometers can provide crucial flight regime information for helicopter gearbox monitoring systems. Typical vibration monitoring systems for helicopter gearboxes rely on single-axis accelerometer data. It is widely assumed that this is adequate. Tri-axial accelerometers measure vibration along three mutually perpendicular axes. The frequency content of the three different directions is compared and analyzed using time-synchronously averaged vibration data from the sensors. The tri-axial data are decorrelated using a mathematical transformation that is known as principal component analysis. The benefits of using tri-axial data for vibration monitoring and diagnostics are explored by analyzing the changes in the direction of the principal axis of vibration formed using all three axes of vibration. The results indicate that tri-axial accelerometers can provide additional information about the frequency content of helicopter gearbox vibrations, providing researchers and industry with a novel method of capturing and monitoring changes in baseline vibration signatures.