First name: Justyna

Last name: Hebda-Sobkowicz

Institution: PWR

Position: PhD student

Title of the planned talk/poster:

Infogram performance analysis and its enhancement for bearingsdiagnostics in presence of non-Gaussian noise

Abstract:

Local damage detection in rotating machines is a well-established field of study, however, some new challengeshave recently appeared. They are associated with the presence of strongly non-Gaussian noise related toharsh environment or technological processes. Searching for cyclic impulses in the presence of non-cyclic,high amplitude impulses becomes difficult. Cyclostationary analysis may be the answer to such a problem. However, it does not recognise the impulsive nature of the signal. Thus, the concept of infogram - a toolwhich investigates diagnostic information both in time and frequency domain seems to be an ideal tool for such an application. It uses the negentropy to measure the impulsiveness of the envelope and as an indicator of the periodicity in the spectral domain. The performance of the infogram for several benchmark signals i.e. Gaussian noise, signals with cyclic impulses and non-cyclic impulses and the mixture of all of them is tested. Finally, the enhancement of the classical infogram is proposed. It is shown that replacing simple averaging of partial infograms by the logarithmic mean, geometric mean or normalizing of partial infograms improves the robustness of classical infogram in case of the presence of strongly non-Gaussian noise. As an illustration, the vibration signal from the machine in the raw materials industry is presented, namely the ore crusher - used for mechanical de-fragmentation of rock oversized pieces. The impulses occurring in this signal come from the crushing process and make the classical diagnosis very difficult. The proposed modification of the classical infogram can deal with such a problem successfully.