Residual signal feature extraction for gearbox planetary stage fault detection - DTU Orbit
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Faults in planetary gears and related bearings, e.g. planet bearings and planet carrier bearings, pose inherent difficulties on their accurate and consistent detection associated mainly to the low energy in slow rotating stages and the operating complexity of planetary gearboxes. In this work, statistical features measuring the signal energy and Gaussianity are calculated from the residual signals between each pair from the first to the fifth tooth mesh frequency of the meshing process in a multi-stage wind turbine gearbox. The suggested algorithm includes resampling from time to angular domain, identification of the expected spectral signature for proper residual signal calculation and filtering of any frequency component not related to the planetary stage. Two field cases of planet carrier bearing defect and planet wheel spalling are presented and discussed, showing the efficiency of the followed approach and the possibility of characterizing a fault as localized or distributed.

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