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Railway track degradation prediction using Wiener process modelling

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Track geometry is critical for railway infrastructures, and the geometry condition and the expected degradation rate are vital for planning maintenance actions to assure the tracks' reliability and safety. The degradation prediction accuracy is, therefore, essential. The Wiener process has been widely used for degradation analysis in various applications based on degradation measurements. In railway infrastructure, however, Wiener process-based degradation models are uncommon. This presentation explores the Wiener process for predicting railway track degradation. First, we review different data-driven approaches found in the literature to estimate the Wiener process parameters and updating them when new measurements are collected. We study different procedures to estimate and update the Wiener process parameters and evaluate their computational performance and prediction errors based on measurement data for a track line in northern Sweden. The result can help to balance the computational complexity and the prediction accuracy when selecting a Wiener process-based degradation model for predictive maintenance of the railway track.

Keywords

Track geometry, degradation modelling, Wiener process

Special/invited session

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