Development of an acceleration-based condition monitoring system for rail track longitudinal level

(thesis @ POLIMI, refer to Prof Di Gialleonardo, Prof Facchinetti, Dr La Paglia)

The increase of rail traffic in the last decades requires a continuous improvement of railway lines monitoring techniques, in order to provide higher levels of infrastructure safety and to properly manage effective maintenance plans.

The aim of the thesis is to develop a model to estimate synthetic indexes for track geometry parameters, based on acceleration measurements gathered on in-service vehicles. In particular, statistical methods have been already successfully implemented for the monitoring of the track longitudinal level on high-speed lines, where service vehicles typically run at fixed speed. However, especially on conventional lines the speed dependency should be accounted for in the estimation process. The thesis relies on experimental data already available in terms of vehicle accelerations and track irregularities.