

# RAILWAY WHEELSET PARAMETER ESTIMATION USING SIGNALS FROM LATERAL VELOCITY SENSOR

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**Abstract-** A type of parameter estimation technique based on the linear integral filter (LIF) method, the least-absolute error with variable forgetting factor (LAE+VFF) estimation method, is proposed in this paper to estimate the railway wheelset parameters modelled as a time-varying continuous-time (C-T) system. The inputs to the parameter estimator are the control signal and the railway wheelset system output, which is the wheelset's lateral velocity. The algorithm includes an instrumental variable (IV) element to reduce estimation bias and a variable forgetting factor for good parameter tracking and smooth steady state. Simulation results have shown that the LAE with fixed forgetting factor gives better parameter estimates compared to the recursive least-squares error (RLSE) method, whereas the LAE+VFF offers even better estimation and tracking of system parameters that are subject to abrupt changes, provided that the  $f_s$  and  $l_f$  values are chosen accordingly. It has also been proven that the estimation error of the proposed LAE+VFF estimation algorithm is bounded.