University of Huddersfield Repository

Ngigi, R. W., Pislaru, Crinela, Ball, Andrew and Gu, Fengshou

Review of control strategies used in modern railway vehicles

Original Citation


This version is available at http://eprints.hud.ac.uk/id/eprint/13496/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

http://eprints.hud.ac.uk/
REVIEW OF CONTROL STRATEGIES USED IN MODERN RAILWAY VEHICLES

R. W. Ngigi, C. Pilearu, A. Ball and F. Gu
University of Huddersfield, Queensgate, Huddersfield HD1 3DH, UK

ABSTRACT

The study of rail vehicle dynamics requires a comprehensive understanding of electrical, mechanical, control engineering aspects of various interactions between the different sub-systems. This paper is an attempt to collate and critically appraise the recent advances in control strategies used to solve challenges related to railway vehicles. These strategies concentrated on stability of solid axle-wheelsets, guidance for wheelsets to provide the function of track following and curving to reduce all unnecessary creep forces and associated wear/noise. The studied methods refer to the control of active primary and secondary suspensions, adhesion, tilt and steer. Suspension, braking, propulsion and guidance force acting on the railway vehicle are related to the wheel and rail contact point. These aspects should be taken into consideration because control systems are conceivably being developed in the railway industry to aid drivers maintain good steering and stability, in addition to providing good comfort to the passengers.

Keywords: railway vehicle; tilt; active control; stability; integrated control