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Autonomous Motion Control of a Wheel Loader

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Paper No. DSCC2009-2653, pp. 427-434; 8 pages

doi:10.1115/DSCC2009-2653

From: ASME 2009 Dynamic Systems and Control Conference

ASME 2009 Dynamic Systems and Control Conference, Volume 2

Hollywood, California, USA, October 12-14, 2009

Conference Sponsors: Dynamic Systems and Control Division

ISBN: 978-0-7918-4893-7 | eISBN: 978-0-7918-3860-0

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ABSTRACT

abstract

This paper addresses the problem of autonomous control of a hydraulically actuated articulated

frame-steering (AFS) mobile machine” a wheel loader. Our autonomous motion control system includes a mission planning graphical user interface, an improved odometry algorithm and a GPS device for navigation purposes, together with a model based path-following control strategy, a speed control. The test platform is a small prototype wheel loader based on Avant-635 whose hydraulic components are substituted by electrically controlled equivalents. System development and preliminary calibrations are done using GIMsim” an elaborated semi-empirical hardware-in-the-loop simulator. Some field experiments are presented that demonstrate satisfactory performance of the system at this stage. Further tunings are required to reach a desired performance.

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