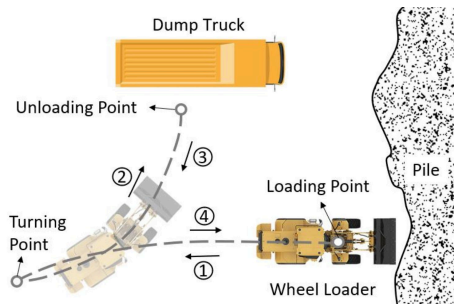


Autonomous Wheel Loader Trajectory Tracking Control Algorithm Using LPV-MPC

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Technology Category

Abstract

Autonomy in construction and mining vehicles is a valuable prospect, allowing machinery to function without direct human intervention and functioning 24/7. This technology streamlines this process, creating an algorithm for effective trajectory-tracking in large, hinged vehicles.

What It Is

An algorithm designed to compute and drive the trajectory of large, hinged vehicles for use in autonomous construction and mining equipment.

Value Proposition

This algorithm is more accurate for system dynamics in hinged vehicles, achieves better tracking performance, and improves computational efficiency, saving energy in autonomous computing systems.

Applicable Markets

Construction, construction vehicles, autonomous vehicles, mining, mining vehicles.

Benefit

Most construction equipment is composed of a front body and a rear body, which are attached by a joint or hinge. The two can articulate with respect to each other, which introduces nonlinear dynamics. Accurately modeling nonlinear dynamics in real-time consumes a great deal of processing power, so most current methods either assume a linear system or do not consider the angle of articulation.

Current solutions are either computationally expensive or too inaccurate for large-scale use. The present technology resolves this issue, providing an algorithm that accurately models nonlinearity in hinged-vehicle trajectory. Though offline computing and various controllers, this algorithm can effectively model and control the movement of large construction and mining machinery in a variety of situations.

Improved computational efficiency translates to decreased energy consumption and initial computer costs. Improved accuracy results in a scalable system that can be implemented industry wide.

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Publications

- R. Song, Z. Ye, L. Wang, T. He and L. Zhang,
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