



SIMULATION AND VERIFICATION OF A DYNAMIC MODEL OF THE ELECTRIC FORKLIFT TRUCK

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ABSTRACT—While the automobile industry of electrically powered cars is still in its infancy stage, the industry vehicles, such as forklift trucks and other material handling equipment have been in production for several decades. Such systems are designed to operate at low speeds which are not critical in terms of occupational safety. On the other hand, material transportation involves extreme driving maneuvers, including high steering and fast acceleration and braking. These maneuvers impose some critical driving situations which can be fatal for operators or any other nearby working person. This paper describes a simple nonlinear vehicle model appropriate for simulation of the three-wheel forklift trucks. The equations model the vehicle behavior at low speeds and at extreme driving maneuvers. To allow model verification, an acquisition system built around a digital signal processor and low-cost sensors was developed. The proposed system provides a platform for further vehicle controller development to be used in signalization or prevention on hazardous situations in the vehicle operating states.

Key Words: forklift truck; simulation model; field verification; driving maneuvers