

Development of fuzzy logic controller for magnetorheological rotary brake system

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Abstract

The conventional contact type brake system which uses a hydraulic system has many problems such as time delay response due to pressure build-up, brake pad wear due to contact movement, bulky size, and low braking performance in a high speed region. As vehicle speed increases, a more powerful brake system is required to ensure vehicle safety and its reliability. In this work, a contact less brake system using a magnetorheological is proposed to overcome the problems. A magnetic fluid changes its properties (viscosity) under the influence of an external magnetic field. This effect is the result of changes in the fluid structure: the ferromagnetic particles of the fluid, being single domains, when subjected to an external magnetic field, become orientated and concentrated along the lines of forces of the magnetic Field. The design of the electromechanical converters mentioned above permits the space between the casing and the moving component of the converter to be filled with the magnetorheological fluid. A coil supplied with power is placed on the moving component of the converter or inside the casing, depending magnetorheological fluid enable to change the parameters of a mechanic system (rigidity, braking force) as a result of electric voltage and current control.

Keywords: Uncontrolled, External magnetic field, Fuzzy logic, Magnetorheological fluid, Rotary brake

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