Theoretical and experimental investigations on a new adaptive duo servo drum brake with high and constant brake shoe factor

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Vehicle brakes generate brake moments and so convert kinetic energy into heat. The ratio between brake force and applied force is defined as brake shoe factor C*. In comparison to disc brakes duo servo drum brakes have a higher C* value. One drawback of drum brakes is their high sensitivity to changes in the coefficient of friction. A constant applied force does not automatically lead to a constant brake force. This work studies whether and how a constant and a high brake shoe factor can be achieved with duo servo drum brake despite a fluctuating coefficient of friction. Since the coefficient of friction can not be directly influenced, the brake's geometry was adapted using an additional actuator. By changing the position of the floating link, the brake shoe factor can be maintained at a constant value independent on the coefficient of friction variations. A prototype of an adaptive duo servo drum brake was built and investigated experimentally on a test rig. The coefficient of friction is calculated using an observer based on the measured brake force. The experimental findings show that a high and constant brake shoe factor can be achieved with duo servo drum brake.