MECHATRONICS BOOK SERIES

SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 2

Editors
Md. Raisuddin Khan
Md. Mozasser Rahman
Muhammad Mahbubur Rashid
Shahrul Na'im Sidek

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INTELLIGENT ANTI SKID CONTROL SYSTEM

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12.1 Introduction

Nowadays, car safety is very crucial and critical criteria for people to have one. This is not only important for the car owners, but also for car companies who have to make sure that their products provide safety during journey. Car accidents occur even though the cars are equipped with high technology safety equipments. This includes Antiskid Braking System where generally the system is to provide controlled braking force to be applied to each wheel of an automotive vehicle by detecting any wheel behavior that the wheel is about to lock. Most cars are equipped with the conventional Antiskid Braking System (ABS) [1-3]. It is known that during emergency braking, it involves high deceleration of wheel as well as the car. The rapid deceleration causes the high coefficient of friction between the wheel and road surface. Therefore, the wheel tends to lock and the car will slip from the road causes difficulty in controlling the car. This situation will cause accident or collision. The most important safety feature in a car is the stability or quick response to control during critical time especially emergency braking. Thus, car skidding is undesirable and need to be avoided at any time. Furthermore, skidding is easier to occur during cornering and road condition is also another factor that leads to accident caused by slipping vehicle. Current existing systems serve this objective, but it is not perfectly and effective enough. Therefore, the intelligent antiskid control system will yield better braking efficiencies under a wide range of conditions [1-2].

With a rapid increase in the number of vehicles on the road, there has also been an increase in accidents of vehicles, particularly cars. According to Malaysia's Ministry of Transportation, 90% of the accidents cases were involving people whom lost control of their car as the car starts to skid during emergency braking. Malaysia is haunted by accident cases which lead to fatality especially during festival seasons. Surprisingly, most cases were caused by the braking system of the car itself. People will step hardly on their brake pedal as they encounter emergency situation hoping that they can avoid collision ahead. Unfortunately, once they hit the brake pedal as hard as they can, their car will brake immediately and the wheels started to lock and thus their car slide and loses balance. This situation will only make the scenario worse whereby the driver cannot control their car especially when they are negotiating a corner. Most of the time, this situation will lead to accident. These alarming statistics necessitates for an enhanced antiskid system, such as this project, that would minimize the probability of car accident due to skidding during braking. Cars equipped with such advanced antiskid system would be a great deal and desirable for potential buyers.