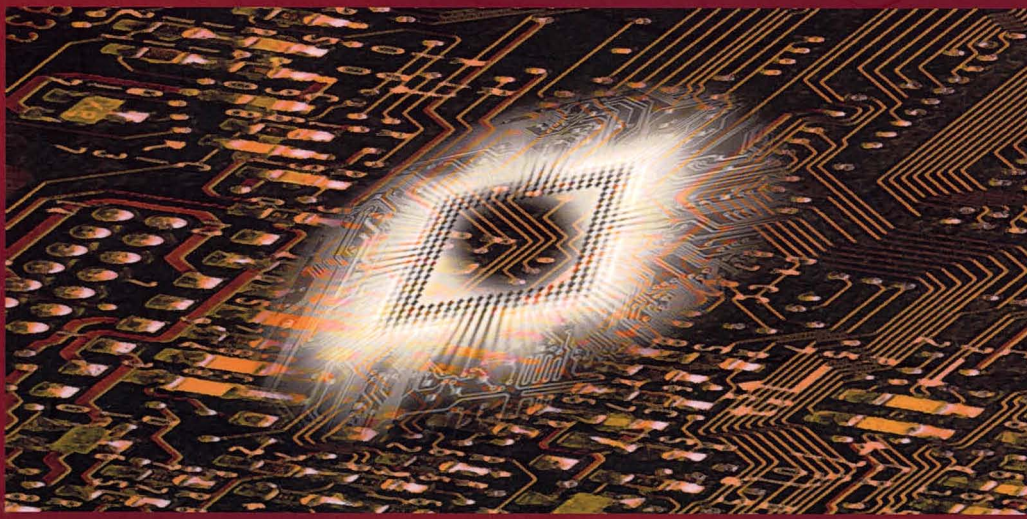
COMPUTATIONAL INTELLIGENCE IN ROBUST CONTROL

Theory and Applications



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Chapter 5

DESIGN AND APPLICATION OF INTELLIGENT FUZZY CONTROLLER ON A QUARTER CAR SUSPENSION SYSTEM

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Abstract

Conventional car suspension systems are usually passive, i.e have a limitation in suspension control due to their fixed damping force. Active suspension system is expensive, complex and unable to contribute any damping force in case of controller failure. Semi-active suspension system which is a modification of active and passive suspension system has been found to be more reliable and robust but yet easier and cheaper than the active suspension system. Magneto Rheological (MR) damper, which is the latest type of damper, can be used for the simulation and online test. Various Intelligent fuzzy based controllers have been designed in this chapter for both active and semi-active system using MR damper. Different inputs and fuzzy rules have also been used in the different fuzzy logic controllers designed. Adjustable damper is fixed in between sprung mass and unsprung mass to control the suspension system. The responses of various controllers were tested with different types of input disturbance, such as sine wave, squarewave, and random number and saw tooth inputs, to simulate the actual road.