

# ”Drive-by-Wire”

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## I. INTRODUCTION

The decision to write a paper on the state of the art of drive-by-wire systems came natural, as we were designing a drive-by-wire system ourselves for our bachelor thesis. With the rise in popularity of electric cars, manufacturers and research groups see new opportunities in overhauling the previous methods of controlling a car. This rise in interest led to many approaches and solutions. The idea of this paper is not to gain new insights, but to provide the reader with a basic understanding of this topic. The content of this paper is mostly based on the findings of the state of the art technology.

The paper is structured as follows. An overview of a drive-by-wire system is given in section II. In Section III we show the different ways how the vehicle dynamics were modelled and implemented in some papers.

Section IV discusses common control algorithms mentioned in the various papers we read, namely sliding mode control, fuzzy control and h-infinity control.

In the early years of the drive-by-wire technology, an implementation seemed far fetched.

## II. DRIVE BY WIRE

### A. Steer by Wire

#### 1) Implementation:

### B. Throttle by Wire

### C. Brake by Wire

#### 1) Implementation:

## III. VEHICLE DYNAMICS, VEHICLE MODEL

### A. Tyre modelling

### B. Bicycle model

### C. Multi-body modelling

## IV. FAULT TOLERANCE

## V. CONTROL ALGORITHMS

### A. Non-Linearity

### B. Sliding Mode Control

### C. Fuzzy Control

### D. H-Infinity Control

## VI. TESTING, VERIFICATION

## VII. RESULTS AND DISCUSSION

## VIII. CONCLUSION

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