

1. Record Nr.	UNINA9910513577003321
Autore	Lenzo Basilio
Titolo	Vehicle Dynamics : Fundamentals and Ultimate Trends
Pubbl/distr/stampa	Cham : , : Springer International Publishing AG , , 2022 ©2022
ISBN	9783030758844 9783030758820
Descrizione fisica	1 online resource (393 pages)
Collana	CISM International Centre for Mechanical Sciences Ser. ; ; v.603
Soggetti	Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	<p>Intro -- Preface -- Contents -- Fundamentals on Vehicle and Tyre Modelling -- 1 Global Vehicle Modeling -- 1.1 Vehicle Dynamics -- 1.2 Dynamic Torsor Calculation -- 1.3 Exterior Forces Torsor Calculation -- 1.4 The Sprung Mass Dynamics -- 1.5 Model Simplification and Validation -- 2 Tire Modeling -- 2.1 Tire Physical Fundamentals -- 2.2 Tire Behavioural Models -- 2.3 Tire Models Linearization -- 2.4 Dynamic Saturation -- 2.5 Simulation of the Linearized Models -- 2.6 Tire Models Comparison -- 2.7 Validation and Relevance of Linearized Tire Models -- References -- Tyre Mechanics and Thermal Effects on Tyre Behaviour -- 1 Introduction to the Tyre -- 2 Tyre Structure -- 3 Mechanics of Tyres -- 4 Tyre Role in Vehicle Dynamics -- 5 Tyre Working Conditions Effects -- 6 Tyre Thermal Modelling in Vehicle Dynamics and Driving Simulations -- 7 Tyre Wear Modelling -- References -- Torque Vectoring Control for Enhancing Vehicle Safety and Energy Efficiency -- 1 Introduction -- 2 Torque Vectoring Control Framework -- 3 Reference Generator: rref, (ref) -- 3.1 Fundamentals on the Design of rref -- 3.2 Design of the Full Vehicle Cornering Response and Driving Modes -- 3.3 Concurrent Yaw Rate and Sideslip Angle Control -- 4 High Level Controller: Ttot, Mz -- 4.1 Calculation of Ttot -- 4.2 Calculation of Mz -- 4.3 Experimental Results and Further Remarks -- 5 Low Level Controller: Tij -- 5.1 Relationships Among Ttot, Mz and Tij -- 5.2 Computation of -- 5.3 An Alternative for Mz:</p>

The Energy Efficiency Mode -- 5.4 Experimental Results and Further Remarks -- References -- State and Parameter Estimation for Vehicle Dynamics -- 1 Introduction -- 1.1 Sensors in Vehicles -- 1.2 Engineering Rules to Extract Quantities of Interest -- 1.3 Sensor Fusion -- 1.4 Example: Longitudinal Vehicle Velocity -- 1.5 Summary -- 2 General Observer and Estimation Methods.

2.1 Physics Driven Observer and Estimation Schemes -- 2.2 Kinematic Versus Dynamic Models for Estimation -- 2.3 Observability for Reliable State Observations and Estimates -- 2.4 Conclusion -- 3 Kalman Filter Based State Estimators for Vehicle Dynamics -- 3.1 Reference Data Description -- 3.2 Decoupled Vehicle State Estimation: Longitudinal Vehicle States -- 3.3 Lateral Vehicle State Estimation -- 4 Kalman Filter Based Estimators for Vehicle Dynamics with Unknown Tire Models -- 4.1 Coupled State/Input and State/Parameter Estimation -- 4.2 Lateral State/Force Estimation -- 4.3 Lateral State/Tire Parameter Estimation -- 4.4 Post-processing for Tire Model Extraction -- 5 Conclusion -- References -- Automated Driving Vehicles -- 1 Introduction -- 1.1 The Role of the Driver -- 1.2 Advanced Driver Assistance Systems and Automated Driving Systems -- 1.3 Concluding Remarks -- 2 Sensor Fusion -- 2.1 Sensor Fusion Configuration -- 2.2 Model-Based Approach -- 2.3 Data-Driven Approach -- 2.4 Safeguarding Sensor Fusion -- 3 Motion Planning for Autonomous Driving -- 3.1 Decision and Motion Planning for Autonomous Vehicles -- 3.2 Safe Driving Envelope Decision and Motion Optimization -- 3.3 Conclusion and Future Works -- 4 Automatic Steering Control for Autonomous Vehicle Path Tracking -- 4.1 Path Tracking Algorithm -- 4.2 Torque Controller -- 4.3 Vehicle Test Results: Automatic Steering Control -- 4.4 Stability Analysis -- 4.5 Conclusion -- 5 Speed and Clearance Control Algorithm for Autonomous Vehicle Longitudinal Control -- 5.1 Vehicle Model for Longitudinal Control -- 5.2 High Level Control: Desired Acceleration Design -- 5.3 Low Level Control: Determine Actuator Inputs -- 5.4 Simulation Study -- 5.5 Conclusion -- 6 Verification and Validation -- 6.1 Scenario-Based Approach -- 6.2 Accelerated Evaluation -- 6.3 The Case Study: Automatic Emergency Braking System.

References.
