

Introduction to Modeling and Control of Internal Combustion Engine Systems

by
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Synopsis

Internal combustion engines (ICE) still have potential for substantial improvements, particularly with regard to fuel efficiency and environmental compatibility. In order to fully exploit the remaining margins, increasingly sophisticated control systems have to be applied. This book offers an introduction to cost-effective model-based control-system design for ICE. The primary emphasis is put on the ICE and its auxiliary devices. Mathematical models for these processes are developed and solutions for selected feedforward and feedback control-problems are presented. The discussions concerning pollutant emissions and fuel economy of ICE in automotive applications constantly intensified since the first edition of this book was published. Concerns about the air quality, the limited resources of fossil fuels and the detrimental effects of greenhouse gases exceedingly spurred the interest of both the industry and academia in further improvements. The most important changes and additions included in this second edition are: restructured and slightly extended section on superchargers, short subsection on rotational oscillations and their treatment on engine test-benches, complete section on modeling, detection, and control of engine knock, improved physical and chemical model for the three-way catalytic converter, new methodology for the design of an air-to-fuel ratio controller, short introduction to thermodynamic engine-cycle calculation and corresponding control-oriented aspects.

What people say about this book

D. SANTANA, "Good... expect a lot of control theory. To take full advantage of this book you need a good background in control theory (mandatory!) and mechanics. The book has excellent information about the variables, approximations and all the stuff relating to gasoline and diesel engines. If you need a more in depth understanding of the principles sometimes explained superficially in "tunning engines books", this is the literature you need, but please have close to you a "mechanics for dummies" in case you get lost with the formulas. This book has some references to an ECU's software guidelines but no program example is presented. The drawbacks: in some figures the letters are missing or misplaced making them a quiz."

Giacomo Micci, "Buon testo. Ho comprato questo testo come integrazione ad un corso di laurea su consiglio del professore titolare del corso. Sicuramente un buon testo con il pregio/difetto di essere in inglese."

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