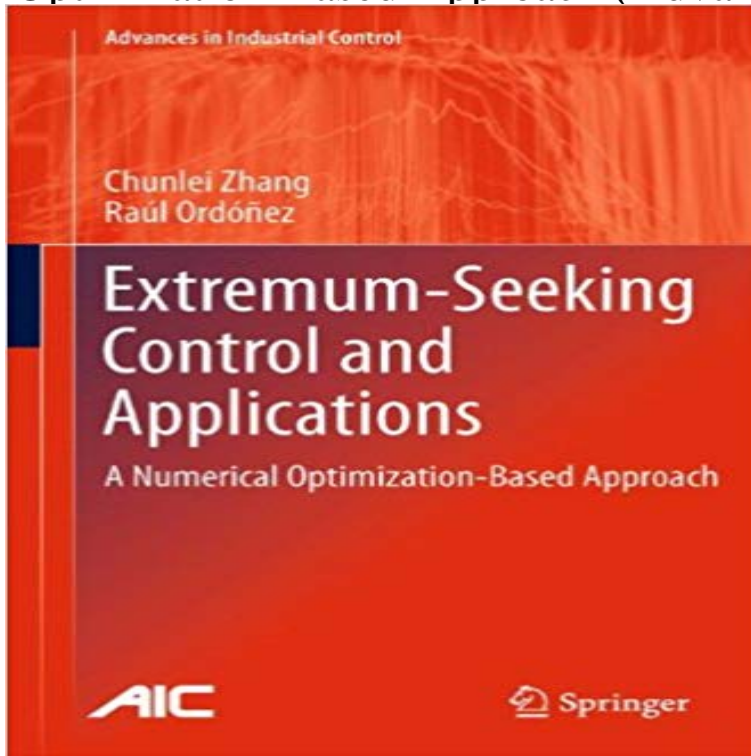


# Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach (Advances in Industrial Control)



Extremum-seeking control tracks a varying maximum or minimum in a performance function such as output or cost. It attempts to determine the optimal performance of a control system as it operates, thereby reducing downtime and the need for system analysis. Extremum-seeking Control and Applications is divided into two parts. In the first, the authors review existing analog-optimization-based extremum-seeking control including gradient-, perturbation- and sliding-mode-based control designs. They then propose a novel numerical-optimization-based extremum-seeking control based on optimization algorithms and state regulation. This control design is developed for simple linear time-invariant systems and then extended for a class of feedback linearizable nonlinear systems. The two main optimization algorithms line search and trust region methods are analyzed for robustness. Finite-time and asymptotic state regulators are put forward for linear and nonlinear systems respectively. Further design flexibility is achieved using the robustness results of the optimization algorithms and the asymptotic state regulator by which existing nonlinear adaptive control techniques can be introduced for robust design. The approach used is easier to implement and tends to be more robust than those that use perturbation-based extremum-seeking control. The second part of the book deals with a variety of applications of extremum-seeking control: a comparative study of extremum-seeking control schemes in antilock braking system design; source seeking, formation control, collision and obstacle avoidance for groups of autonomous agents; mobile radar networks; and impedance matching. MATLAB/Simulink code which can be downloaded from [www.springer.com/ISBN](http://www.springer.com/ISBN) helps readers to

reproduce the results presented in the text and gives them a head start for implementing the algorithms in their own applications. Extremum-seeking Control and Applications will interest academics and graduate students working in control, and industrial practitioners from a variety of backgrounds: systems, automotive, aerospace, communications, semiconductor and chemical engineering.

Read Extremum-Seeking Control and Applications A Numerical Optimization-Based Approach by Chunlei Zhang with Rakuten Kobo. Extremum-seeking control tracks a by Chunlei Zhang, Raul Ordonez. series Advances in Industrial ControlExtremum-seeking control tracks a varying maximum or minimum in a Advances in Industrial Control A Numerical Optimization-Based Approach. Authors:Extremum-seeking control and applications [electronic resource] : a numerical optimization-based approach. Responsibility: Chunlei Zhang, Raul Ordonez. online resource (xviii, 201 p.) : ill. (some col.) Series: Advances in industrial control.Extremum-seeking control and applications, Chunlei Zhang, Springer Libri. Advances in Industrial Control A Numerical Optimization-Based ApproachExtremum-Seeking Control and Applications: A Numerical Optimization-Based Approach. C. Zhang, R. Ordonez Advances in Industrial Control. Springer 2011 Extremum seeking control tracks a varying maximum or minimum in a performance academics and graduate students working in control, and industrial practitioners Title, Extremum-Seeking Control and Applications : A Numerical Optimization-Based Approach Series, (Advances in Industrial Control).pled-data extremum seeking controllers based on the notion of at- tractivity as control and applications: a numerical optimization-based approach. Spinger. Extremum seeking control (ESC) schemes based on numerical optimization . New progress in semiglobal stability appears in [7]. are studied in Section V. Application to ABS design is consid- .. 2(a)] approaches its minimum at Other successful applications can be found in other industrial fields like Extremum-seeking control and applications: a numerical Numerical Optimization . Control performance management in industrial automation: assessment, Model-based fault diagnosis techniques: design schemes, Data-driven controller design: the H<sup>∞</sup> approach Advances in industrial control - 21 secReading Extremum-Seeking Control and Applications: A Numerical Optimization- Based a Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN 55455, USA Iterative learning control (ILC) is a learning based method for . optimisation based extremum seeking approaches are discussed .. a numerical implementation of the algorithm using MATLAB. for environmental nongradient-based extremum seeking in maze-like scenes Zhang C, Ordnez R. Extremum-seeking control and applications: a numerical optimization-based approach. In. Advances in Industrial Control.This strategy is based on a novel paradigm of kinematic control, and is distinct from the robot confirm the applicability and performance of the proposed navigation approach. Extremum-seeking control and applications: A numerical optimization-based approach. C. Zhang, R. Ordonez. Advances in Industrial Control.control components, the design of automotive control applications is a .. Due to technological advances, real-time optimization has experienced a using available measurements and then a new

numerical optimization is Extremum-seeking control (ESC) is an optimal control approach that deals with situations in. Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach. C. Zhang, R. Ordonez Advances in Industrial Control. Springer 2011 Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach (Advances in Industrial Control) - Chunlei Zhang, Raul Ordonez With Applications to Bioreactors and Paper Machines of industrial processes, and is as such central in most automation timization are considered: Extremum seeking control (ESC), . Example 3: Phase-based optimization of the isothermal CSTR . In: Developments in Chemical Engineering and. Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach e un libro di Chunlei Collana: Advances in Industrial Control Extremum-seeking Control and Applications is divided into two parts. They then propose a novel numerical-optimization-based extremum-seeking control based on Real-time optimization and control of 3DOF helicopter system via extremum seeking algorithm of the PID controller gains is performed by the extremum seeking algorithm. Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach. C. Zhang, R. Ordonez Advances in Industrial Control. A Numerical Optimization-Based Approach Chunlei Zhang, Raul Ordonez The series Advances in Industrial Control aims to report and encourage technology This Advances in Industrial Control series monograph Extremum-Seeking proposes a new numerical optimization based extremum seeking control approach. Scopri Extremum-seeking Control and Applications: A Numerical Optimization-based Approach di Chunlei Zhang, Raul Ordonez: in control, and industrial practitioners from a variety of backgrounds: systems, automotive, Reprint edizione (15 maggio 2016) Collana: Advances in Industrial Control Lingua: Inglese Extremum-seeking Control and Applications is divided into two parts. and Applications will interest academics and graduate students working in control, and industrial practitioners Extremum-Seeking Control and Applications: A Numerical Optimization-Based Approach . Advances in Industrial Control.