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Mathematical modeling in energy homeostasis, appetite control and food intake with a special attention to ghrelin
An Introduction to Numerical Methods and Analysis
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Numerical Computing with MATLAB
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You @ the U
Digital Signal Processing Using MATLAB
MATLAB Primer, Eighth Edition
MATLAB for Neuroscientists
MIMO-OFDM Wireless Communications with MATLAB
Computational Finance
Digital Signal Processing Using MATLAB for Students and Researchers

JOHN BEST

Matlab On Campus

A handbook for MATLAB which gives a focused approach to the software for students and professional researchers.

Mathematics for Neuroscientists Cambridge University Press

This is part 2 of a 3 volume series for middle school students.

Math Explorations John Wiley & Sons

The elegant 'interconnected mechanisms' by which the gastrointestinal (GI) tract regulates food intake are a marvel of biology, but the redundancy (e.g., several hormones seem to have effects in food intake) of both GI (by means of hormones) and central nervous system (CNS, by means of satiety/satiation signals) pathways governing energy homeostasis poses formidable challenges for scientists trying to take a clear glimpse of this machinery, e.g. for designing anti-obesity and alike pharmaceuticals. In essence, notwithstanding the astonishing advancements made over the past few decades in unscrambling many of the molecular pathways involved in energy (homeostasis) regulation, a rather cloudy understanding of "how all the pieces fit together to function as an integrated system" is what can be found for the most part in the scientific community; we discuss that in part II of the work, in a single chapter divided in several sections for numerous imperative hormones, e.g. cholecystokinin. The current work is divided into three parts: part I is regarding fundamentals of physiology and mathematical modeling employed all over the work; part II is more generic and concerns several hormones (what we have called a "web of hormones") and part III (divided into three chapters) is more specific, concerning a single hormone (i.e., ghrelin). The core of the work is part III, and to a certain extent part II, bearing mind we provide a literature review based on papers scattered/dispersed all over the medical science literature. The main objective of this work is proposing a mathematical model for ghrelin dynamics (Figure 70), a model centered on the gastrointestinal tract (stomach + small intestine, a two-

compartment model), with daily-like dynamics, short-term dynamics; and, simultaneously, proposing a prototype for a systems biology like model (figure 40), a model based on numerous hormones, for understanding mathematically food intake/bodyweight control. Ghrelin is a quite powerful orexigenic hormone discovered in the late 1990s that controls appetite and energy homeostasis, alongside leptin and other hormones still to be investigated in depth by the medical sciences literature. Accordingly, we provide a (simple) mathematical model, consisting of a set of ordinary differential equations detailing ghrelin dynamics combined to gastrointestinal signals due to meals. Numerical simulations are able to replicate in silico available data from the literature; additionally, we were able to fit a reduced version of the basal model to experimental data. The model is developed as a module for a bigger potential multi-compartmental structure, detailing food and energy homeostasis within a sort of "a web of hormones" (see part II and the last chapter of part III). The present contribute is to recommend a primary mathematical model for ghrelin dynamics centered in the gastrointestinal tract, with potentiality to be applied also for postabsorptive states, left mainly as future works. We go on with the model by presenting mainly two variations, further unfolding is left as future endeavor: tastants and stochastic version. We test several optimization routines for the parameter estimation procedure, hybrid algorithms (global + local search), for parameter estimation, based on data published for humans (three meals a day). For all the routines, the best is a hybrid composed of simulating annealing as global search and pattern search as local search. In the objective function (sum of the squared errors, SSE), we apply artificial neural networks (a two-layer feedforward neural network) for generating new data from the data already published, a strategy adopted to increase the data set. In the last part of the chapter about ghrelin modeling (part III), we propose several prototypes for future works based on the basal models; the model used for parameter estimation is a "minimal/reduced" model; we also provide discussions and future works for the minimal model and parameter estimation. Key-words. Ghrelin; leptin; mathematical modelling; food intake; appetite; parameter

estimation.

Photonics Applications in Industry and Research IV Academic Press

Driving 5G Mobile Communications with Artificial Intelligence towards 6G presents current work and directions of continuously innovation and development in multimedia communications with a focus on services and users. The fifth generation of mobile wireless networks achieved the first deployment by 2020, completed the first phase of evolution in 2022, and started transition phase of 5G-Advanced toward the sixth generation. Perhaps one of the most important innovations brought by 5G is the platform-approach to connectivity, i.e., a single standard that can adapt to the heterogeneous connectivity requirements of vastly different use cases. 5G networks contain a list of different requirements, standardized technical specifications and a range of implementation options with spectral efficiency, latency, and reliability as primary performance metrics. Towards 6G, machine learning (ML) and artificial intelligence (AI) methods have recently proposed new approaches to modeling, designing, optimizing and implementing systems. They are now matured technologies that improve many research fields significantly. The area of wireless multimedia communications has developed immensely, generating a large number of concepts, ideas, technical specifications, mobile standards, patents, and articles. Identifying the basic ideas and their complex interconnections becomes increasingly important. The book is divided into three major parts, with each part containing four or five chapters: Advanced 5G communication Machine learning-based communication and network automation Artificial Intelligence towards 6G The first part discusses three main scenarios and standard specification of 5G use cases (eMBB, URLLC, mMTC), vehicular systems beyond 5G, and efficient edge architecture on NFV infrastructure. In the second part, different AI/ML-based methodologies and open research challenges are presented in introducing 5G-AIoT artificial intelligence of things, scheduling in 5G/6G communication systems, application of DL techniques to modulation, detection, and channel coding as well as 5G Open Source tools for experimentations and testing. The third part paved the way to

deployment scenarios for different innovative services including technologies and applications of 5G/6G intelligent connectivity, AI-assisted eXtended Reality, integrated 5G-IoT architecture in next-generation Smart Grid, privacy requirements in a hyper-connected world, and evaluation of representative 6G use cases and technology trends. The book is written by field experts from Europe and Mauritius who introduce a blend of scientific and engineering concepts covering this emerging wireless communication era. It is a very good reference book for telecom professionals, engineers, and practitioner in various 5G vertical domains and, finally, a basis for student courses in 5G/6G wireless systems.

Introduction to Mechanism Design SIAM

Introduction to Mechanism Design: with Computer Applications provides an updated approach to undergraduate Mechanism Design and Kinematics courses/modules for engineering students. The use of web-based simulations, solid modeling, and software such as MATLAB and Excel is employed to link the design process with the latest software tools for the design and analysis of mechanisms and machines. While a mechanical engineer might brainstorm with a pencil and sketch pad, the final result is developed and communicated through CAD and computational visualizations. This modern approach to mechanical design processes has not been fully integrated in most books, as it is in this new text.

Getting Started with MATLAB 7 Elsevier

Preface to the First Edition This textbook is an introduction to Scientific Computing. We will illustrate several numerical methods for the computer solution of certain classes of mathematical problems that cannot be faced by paper and pencil. We will show how to compute the zeros or the integrals of continuous functions, solve linear systems, approximate functions by polynomials and construct accurate approximations for the solution of differential equations. With this aim, in Chapter 1 we will illustrate the rules of the game that computers adopt when storing and operating with real and complex numbers, vectors and matrices. In order to make our presentation concrete and appealing we will adopt the programming environment MATLAB as a faithful companion. We will gradually discover its principal commands, statements and constructs. We will show how to execute all the algorithms that we introduce throughout the book. This will enable us to furnish

an immediate quantitative assessment of their theoretical properties such as stability, accuracy and complexity. We will solve several problems that will be raised through exercises and examples, often stemming from scientific applications.

MATLAB for Psychologists Butterworth-Heinemann

MATLAB is one of the most widely used tools in the field of engineering today. Its broad appeal lies in its interactive environment with hundreds of built-in functions. This book is designed to get you up and running in just a few hours.

Orbital Mechanics for Engineering Students Springer Science & Business Media

This textbook presents a variety of applied mathematics topics in science and engineering with an emphasis on problem solving techniques using MATLAB. The authors provide a general overview of the MATLAB language and its graphics abilities before delving into problem solving, making the book useful for readers without prior MATLAB experience.

A MATLAB Exercise Book John Wiley & Sons

An introduction to modeling and simulating physical systems with MATLAB, mathematical computing software for engineers and scientists. A concise introduction to programming and modeling real world systems with MATLAB, a popular programming language for science and engineering. Unlike competing books which are often too mathematical and theoretical, this book by best-selling author Allen Downey is designed to be practical, with an emphasis on thinking about how to design and use models. The author shows you that systems may have many possible models and shows you how to justify modeling decisions, choose appropriate models, validate your choices, and iteratively improve your models. You are taught basic programming skills and how to combine them with MATLAB to model and simulate systems like population growth, baseball flight trajectories, bungee jumping, and celestial mechanics. For example, the book explores concepts like the Penny Drop Myth: the claim that a penny dropped from the top of the Empire State Building lands with enough force to injure a person or the sidewalk. The author addresses this myth by developing and implementing three models of the system, including or excluding features like air resistance and spin. Other physical systems include animal population growth, the coffee cooling problem, baseball trajectories, bungee jumping, and celestial mechanics. You'll learn

to use MATLAB to visualize and summarize your results, as well as how to use your models to predict, explain, and design systems. The book presents applications from a range of areas including demography, thermodynamics, epidemiology, ecology, pharmacokinetics, and mechanics. Numerous exercises, sample code, and MATLAB Live Scripts (notebooks that include code, results, and explanatory text) help you develop the knowledge and skills necessary to work comfortably in MATLAB.

Learning MATLAB Lulu.com

"This completely revised new edition is based on the latest version of MATLAB. New chapters cover handling graphics, graphical user interfaces (GUIs), structures and cell arrays, and importing/exporting data. The chapter on numerical methods now includes a general GUI-driven ODE solver."--Jacket.

Driving 5G Mobile Communications with Artificial Intelligence towards 6G Butterworth-Heinemann

First-year university is challenging, but counsellor Janet Miller promises that it doesn't need to be overwhelming. Whether you're transitioning straight from high school or have taken a gap year, this guided tour through first year demystifies the process – from registering for classes and making the most of orientation to prepping for exams. With wit and wisdom, Miller shares what she's learned from thousands of students who have walked the campus hallways before you. This book doesn't tell you what you should do. It tells you what you need to know so you can follow in their footsteps, hit your own stride, and thrive.

A Guide to MATLAB Cambridge University Press

Computational finance is increasingly important in the financial industry, as a necessary instrument for applying theoretical models to real-world challenges. Indeed, many models used in practice involve complex mathematical problems, for which an exact or a closed-form solution is not available. Consequently, we need to rely on computational techniques and specific numerical algorithms. This book combines theoretical concepts with practical implementation. Furthermore, the numerical solution of models is exploited, both to enhance the understanding of some mathematical and statistical notions, and to acquire sound programming skills in MATLAB®, which is useful for several other programming languages also. The material assumes the reader has a relatively limited knowledge of mathematics, probability, and statistics. Hence, the book contains a short description of the

fundamental tools needed to address the two main fields of quantitative finance: portfolio selection and derivatives pricing. Both fields are developed here, with a particular emphasis on portfolio selection, where the author includes an overview of recent approaches. The book gradually takes the reader from a basic to medium level of expertise by using examples and exercises to simplify the understanding of complex models in finance, giving them the ability to place financial models in a computational setting. The book is ideal for courses focusing on quantitative finance, asset management, mathematical methods for economics and finance, investment banking, and corporate finance.

Getting Started with MATLAB 5 Academic Press

Highlighting the new aspects of MATLAB® 7.10 and expanding on many existing features, MATLAB® Primer, Eighth Edition shows you how to solve problems in science, engineering, and mathematics. Now in its eighth edition, this popular primer continues to offer a hands-on, step-by-step introduction to using the powerful tools of MATLAB. New to the Eighth Edition A new chapter on object-oriented programming Discussion of the MATLAB File Exchange window, which provides direct access to over 10,000 submissions by MATLAB users Major changes to the MATLAB Editor, such as code folding and the integration of the Code Analyzer (M-Lint) into the Editor Explanation of more powerful Help tools, such as quick help popups for functions via the Function Browser The new `bsxfun` function A synopsis of each of the MATLAB Top 500 most frequently used functions, operators, and special characters The addition of several useful features, including sets, logical indexing, `isequal`, `repmat`, `reshape`, `varargin`, and `varargout` The book takes you through a series of simple examples that become progressively more complex. Starting with the core components of the MATLAB desktop, it demonstrates how to handle basic matrix operations and expressions in MATLAB. The text then introduces commonly used functions and explains how to write your own functions, before covering advanced features, such as object-oriented programming, calling other languages from MATLAB, and MATLAB graphics. It also presents an in-depth look at the Symbolic Toolbox, which solves problems analytically rather than numerically.

Numerical Solution of Ordinary Differential Equations

Springer

Orbital Mechanics for Engineering Students, Second Edition, provides an introduction to the basic concepts of space mechanics. These include vector kinematics in three dimensions; Newton's laws of motion and gravitation; relative motion; the vector-based solution of the classical two-body problem; derivation of Kepler's equations; orbits in three dimensions; preliminary orbit determination; and orbital maneuvers. The book also covers relative motion and the two-impulse rendezvous problem; interplanetary mission design using patched conics; rigid-body dynamics used to characterize the attitude of a space vehicle; satellite attitude dynamics; and the characteristics and design of multi-stage launch vehicles. Each chapter begins with an outline of key concepts and concludes with problems that are based on the material covered. This text is written for undergraduates who are studying orbital mechanics for the first time and have completed courses in physics, dynamics, and mathematics, including differential equations and applied linear algebra. Graduate students, researchers, and experienced practitioners will also find useful review materials in the book.

NEW: Reorganized and improved discussions of coordinate systems, new discussion on perturbations and quaternions NEW: Increased coverage of attitude dynamics, including new Matlab algorithms and examples in chapter 10 New examples and homework problems

MATLAB Demystified CRC Press

The matrix laboratory interactive computing environment—MATLAB—has brought creativity to research in diverse disciplines, particularly in designing and programming experiments. More commonly used in mathematics and the sciences, it also lends itself to a variety of applications across the field of psychology. For the novice looking to use it in experimental psychology research, though, becoming familiar with MATLAB can be a daunting task. MATLAB for Psychologists expertly guides readers through the component steps, skills, and operations of the software, with plentiful graphics and examples to match the reader's comfort level. Using an extended illustration, this concise volume explains the program's usefulness at any point in an experiment, without the limits imposed by other types of software. And the authors demonstrate the responsiveness of MATLAB to the individual's research needs,

whether the task is programming experiments, creating sensory stimuli, running simulations, or calculating statistics for data analysis. Key features of the coverage: Thinking in a matrix way. Handling and plotting data. Guidelines for improved programming, sound, and imaging. Statistical analysis and signal detection theory indexes. The Graphical User Interface. The Psychophysics Toolbox. MATLAB for Psychologists serves a wide audience of advanced undergraduate and graduate level psychology students, professors, and researchers as well as lab technicians involved in programming psychology experiments. [Applied Computer Science for GGOS Observatories](#) SAE International

MATLAB for Neuroscientists serves as the only complete study manual and teaching resource for MATLAB, the globally accepted standard for scientific computing, in the neurosciences and psychology. This unique introduction can be used to learn the entire empirical and experimental process (including stimulus generation, experimental control, data collection, data analysis, modeling, and more), and the 2nd Edition continues to ensure that a wide variety of computational problems can be addressed in a single programming environment. This updated edition features additional material on the creation of visual stimuli, advanced psychophysics, analysis of LFP data, choice probabilities, synchrony, and advanced spectral analysis. Users at a variety of levels—advanced undergraduates, beginning graduate students, and researchers looking to modernize their skills—will learn to design and implement their own analytical tools, and gain the fluency required to meet the computational needs of neuroscience practitioners. The first complete volume on MATLAB focusing on neuroscience and psychology applications Problem-based approach with many examples from neuroscience and cognitive psychology using real data Illustrated in full color throughout Careful tutorial approach, by authors who are award-winning educators with strong teaching experience

Matlab for Engineers Jorge Guerra Pires

MatLab, Third Edition is the only book that gives a full introduction to programming in MATLAB combined with an explanation of the software's powerful functions, enabling engineers to fully exploit its extensive capabilities in solving engineering problems. The book provides a systematic, step-by-step approach, building on concepts throughout the text, facilitating easier learning. Sections

on common pitfalls and programming guidelines direct students towards best practice. The book is organized into 14 chapters, starting with programming concepts such as variables, assignments, input/output, and selection statements; moves onto loops; and then solves problems using both the 'programming concept' and the 'power of MATLAB' side-by-side. In-depth coverage is given to input/output, a topic that is fundamental to many engineering applications. Vectorized Code has been made into its own chapter, in order to emphasize the importance of using MATLAB efficiently. There are also expanded examples on low-level file input functions, Graphical User Interfaces, and use of MATLAB Version R2012b; modified and new end-of-chapter exercises; improved labeling of plots; and improved standards for variable names and documentation. This book will be a valuable resource for engineers learning to program and model in MATLAB, as well as for undergraduates in engineering and science taking a course that uses (or recommends) MATLAB. Presents programming concepts and MATLAB built-in functions side-by-side Systematic, step-by-step approach, building on concepts throughout the book, facilitating easier learning Sections on common pitfalls and programming guidelines direct students towards best practice

Learning MATLAB McGraw-Hill Medical Publishing

This book combines elementary theory from computer science with real-world challenges in global geodetic observation, based

on examples from the Geodetic Observatory Wettzell, Germany. It starts with a step-by-step introduction to developing stable and safe scientific software to run successful software projects. The use of software toolboxes is another essential aspect that leads to the application of generative programming. An example is a generative network middleware that simplifies communication. One of the book's main focuses is on explaining a potential strategy involving autonomous production cells for space geodetic techniques. The complete software design of a satellite laser ranging system is taken as an example. Such automated systems are then combined for global interaction using secure communication tunnels for remote access. The network of radio telescopes is used as a reference. Combined observatories form coordinated multi-agent systems and offer solutions for operational aspects of the Global Geodetic Observing System (GGOS) with regard to "Industry 4.0".

Solving ODEs with MATLAB Academic Press

A concise introduction to numerical methods and the mathematical framework needed to understand their performance Numerical Solution of Ordinary Differential Equations presents a complete and easy-to-follow introduction to classical topics in the numerical solution of ordinary differential equations. The book's approach not only explains the presented mathematics, but also helps readers understand how these numerical methods are used

to solve real-world problems. Unifying perspectives are provided throughout the text, bringing together and categorizing different types of problems in order to help readers comprehend the applications of ordinary differential equations. In addition, the authors' collective academic experience ensures a coherent and accessible discussion of key topics, including: Euler's method Taylor and Runge-Kutta methods General error analysis for multi-step methods Stiff differential equations Differential algebraic equations Two-point boundary value problems Volterra integral equations Each chapter features problem sets that enable readers to test and build their knowledge of the presented methods, and a related Web site features MATLAB® programs that facilitate the exploration of numerical methods in greater depth. Detailed references outline additional literature on both analytical and numerical aspects of ordinary differential equations for further exploration of individual topics. Numerical Solution of Ordinary Differential Equations is an excellent textbook for courses on the numerical solution of differential equations at the upper-undergraduate and beginning graduate levels. It also serves as a valuable reference for researchers in the fields of mathematics and engineering.

Numerical Methods in Scientific Computing: CRC Press

A revised textbook for introductory courses in numerical methods, MATLAB and technical computing, which emphasises the use of mathematical software.