

Matlab And Simulink For Engineers

Computer-Aided Control Systems Design: Practical Applications Using MATLAB® and Simulink® supplies a solid foundation in applied control to help you bridge the gap between control theory and its real-world applications. Working from basic principles, the book delves into control systems design through the practical examples of the ALSTOM gasifier system in power stations and underwater robotic vehicles in the marine industry. It also shows how powerful software such as MATLAB® and Simulink® can aid in control systems design. *Make Control Engineering Come Alive with Computer-Aided Software* Emphasizing key aspects of the design process, the book covers the dynamic modeling, control structure design, controller design, implementation, and testing of control systems. It begins with the essential ideas of applied control engineering and a hands-on introduction to MATLAB and Simulink. It then discusses the analysis, model order reduction, and controller design for a power plant and the modeling, simulation, and control of a remotely operated vehicle (ROV) for pipeline tracking. The author explains how to obtain the ROV model and verify it by using computational fluid dynamic software before designing and implementing the control system. In addition, the book details the nonlinear subsystem modeling and linearization of the ROV at vertical plane equilibrium points. Throughout, the author delineates areas for further study. Appendices provide additional information on various simulation models and their results. *Learn How to Perform Simulations on Real Industry Systems* A step-by-step guide to computer-aided applied control design, this book supplies the knowledge to help you deal with control problems in industry. It is a valuable reference for anyone who wants a better understanding of the theory and practice of basic control systems design, analysis, and implementation.

Written in two parts, the first revises the ideas and theoretical bases necessary for a good understanding of the techniques used in the second, which deals with applications of MATLAB(R) and SIMULINK(R) in process control and digital signal processing. Each application is treated through various techniques including the classical methods of automation and of deterministic and random digital processing using fuzzy logic and neural networks. The preceding mathematical study of the physical processes goes from finding the equations to editing the analogical model. The following SIMULINK(R) toolbox functions and blocks have been used: Control System, Signal Processing, Neural Network and Fuzzy Logic.

An introductory text on Simulink to provide a complete reference on the subject. Contains a plethora of examples with step-by-step solutions. Includes background information for students and working professionals who may not be familiar with certain topics.

This book accomplishes two things simultaneously: it teaches you to use the latest version of the powerful MATLAB programming environment, and it teaches you core, transferrable programming skills that will make you feel at home with most procedural programming languages. MATLAB has been in existence for more than 30 years and is used by millions of engineers, scientists, and students worldwide, both for its depth and its easy usability. With dozens of specialized toolboxes available beyond the core program, as well as its companion program Simulink for simulation and model-based design, MATLAB can serve as an invaluable aid throughout your career. Unlike many

MATLAB books, ours assumes no prior experience in computer programming. Using an approachable tone, we take you from the simplest variables through complex examples of data visualization and curve fitting. Each chapter builds on the last, presenting an in-depth tutorial on a focused concept central to programming, using the MATLAB language, but applicable to countless other popular and in-demand languages such as C++, Java, JavaScript, R, and Python. We'll ask you to perform short exercises as we work through each chapter, followed by more end-to-end exercises and mental challenges at the chapter's end. As the complexity of the concepts increases, the exercises present increasingly real-world engineering challenges to match. Once you've completed *An Engineer's Introduction to Programming with MATLAB 2018*, you will have a solid foundation in computer programming forms and concepts and a comfort with the MATLAB environment and programming language. We believe that you'll enjoy both gaining and having that knowledge, and that you'll be able to use it almost immediately with your other coursework.

This book offers a unified presentation that does not discriminate between atmospheric and space flight. It demonstrates that the two disciplines have evolved from the same set of physical principles and introduces a broad range of critical concepts in an accessible, yet mathematically rigorous presentation. The book presents many MATLAB and Simulink-based numerical examples and real-world simulations. Replete with illustrations, end-of-chapter exercises, and selected solutions, the work is primarily useful as a textbook for advanced undergraduate and beginning graduate-level students.

The book presents several approaches in the key areas of practice for which the MATLAB software package was used. Topics covered include applications for: -Motors -Power systems -Robots -Vehicles The rapid development of technology impacts all areas. Authors of the book chapters, who are experts in their field, present interesting solutions of their work. The book will familiarize the readers with the solutions and enable the readers to enlarge them by their own research. It will be of great interest to control and electrical engineers and students in the fields of research the book covers. Conventionally, the simulation of power engineering applications can be a challenge for both undergraduate and postgraduate students. For the easy implementation of several kinds of power structure and control structures of power engineering applications, simulators such as MATLAB/(Simulink and coding) are necessary, especially for students, to develop and test various circuits and controllers in all branches of the field of power engineering. This book presents three different applications of MATLAB in the power system domain. The book includes chapters that show how to simulate and work with MATLAB software for MATLAB professional applications of power systems. Moreover, this book presents techniques to simulate power matters easily using the related toolbox existing in MATLAB/Simulink.

Featuring a variety of applications that motivate students, this book serves as a companion or supplement to any of the comprehensive textbooks in communication systems. The book provides a variety of exercises that may be solved on the computer using MATLAB,,? (The authors assume that the student is familiar with the fundamentals of MATLAB). By design, the treatment of the various topics is brief. The authors provide the motivation and a short introduction to each topic, establish the necessary notation, and then illustrate the basic concepts by means of an example.

MATLAB/Simulink Essentials is an interactive approach based guide for students to learn how to employ essential and hands-on tools and functions of the MATLAB and Simulink packages to solve engineering and scientific computing problems, which are explained and demonstrated explicitly via examples, exercises and case studies. The main principle of the book is based on learning by doing and mastering by practicing. It contains hundreds of solved problems with simulation models via M-files/scripts and Simulink models related to engineering and scientific computing issues. There are many hints and pitfalls indicating efficient usage of MATLAB/Simulink tools and functions, efficient programming methods and pinpointing most common errors occurred in programming and using MATLAB's built-in tools and functions and Simulink modeling. Every chapter ends with relevant drill exercises for self-testing purposes.

This text is written for use in a second course in circuit analysis. It encompasses a spectrum of subjects ranging from the most abstract to the most practical, and the material can be covered in one semester or two quarters. The reader of this book should have the traditional undergraduate knowledge of an introductory circuit analysis material such as Circuit Analysis I with MATLAB Computing and Simulink/ SimPowerSystems Modeling, ISBN 978-1-934404-17-1. Another prerequisite would be a basic knowledge of differential equations, and in most cases, engineering students at this level have taken all required mathematics courses. Appendix H serves as a review of differential equations with emphasis on engineering related topics and it is recommended for readers who may need a review of this subject.

"Control System Analysis & Design in MATLAB and SIMULINK" is blueprinted to solve undergraduate control system engineering problems in MATLAB platform. Unified view of control system fundamentals is taken into account in the text. One key aspect of the text is the presentation of computing and graphing materials in a simple intuitive way. Many advances in virtual implementation on control systems have been seen in the past decade. The text elucidates the web of concepts underpinning these advances. Self-working out illustrations and end-of-chapter exercises enthuse the reader a checkup on thorough understanding. The comprehensive introduction will benefit both undergraduates and graduates studying control system and engineering. Also researchers in the field can have the text as reference.

This book is a fast-paced guide with practical, hands-on recipes which will show you how to prototype Beagleboard-based audio/video applications using Matlab/Simulink and Sourcery Codebench on a Windows host. Beagleboard Embedded Projects is great for students and academic researchers who have practical ideas and who want to build a proof-of-concept system on an embedded hardware platform quickly and efficiently. It is also useful for product design engineers who want to ratify their applications and reduce the time-to-market. It is assumed that you are familiar with Matlab/Simulink and have some basic

knowledge of computer hardware. Experience in Linux is favoured but not necessary, as our software development is purely on a Windows host. MATLAB and Simulink Crash Course for Engineers is a reader-friendly introductory guide to the features, functions, and applications of MATLAB and Simulink. The book provides readers with real-world examples, exercises, and applications, and offers highly illustrated, step-by-step demonstrations of techniques for the modelling and simulation of complex systems. MATLAB coverage includes vectors and matrices, programs and functions, complex numbers, visualization, solving equations, numerical methods, optimization problems, and graphical user interfaces. The Simulink coverage includes commonly used Simulink blocks, control system simulation, electrical circuit analysis, electric power systems, power electronics, and renewable energy technology. This powerful tutorial is a great resource for students, engineers, and other busy technical professionals who need to quickly acquire a solid understanding of MATLAB and Simulink.

Based on the latest MATLAB and Simulink 2011 Releases of The MathWorks products, Introduction to Simulink® with Engineering Applications, Third Edition, begins with Simulink modeling of real-world examples, Chapters 1 through 5, then guides you through the entire spectrum of the functional blocks in the Simulink libraries in Appendixes A through T, and provides an example for each, often augmented with the underlying theory.

MATLAB is a high-performance technical computing language. It has an incredibly rich variety of functions and vast programming capabilities. SIMULINK is a software package for modeling, simulating, and analysing dynamic systems. MATLAB and SIMULINK are integrated and one can simulate, analyse, or revise the models in either environment. The book MATLAB and SIMULINK for Engineers aims to capture the beauty of these software and serve as a self study material for engineering students who would be required to use these software for varied courses.

A timely introduction to current research on PID and predictive control by one of the leading authors on the subject PID and Predictive Control of Electric Drives and Power Supplies using MATLAB/Simulink examines the classical control system strategies, such as PID control, feed-forward control and cascade control, which are widely used in current practice. The authors share their experiences in actual design and implementation of the control systems on laboratory test-beds, taking the reader from the fundamentals through to more sophisticated design and analysis. The book contains sections on closed-loop performance analysis in both frequency domain and time domain, presented to help the designer in selection of controller parameters and validation of the control system.

Continuous-time model predictive control systems are designed for the drives and power supplies, and operational constraints are imposed in the design. Discrete-time model predictive control systems are designed based on the discretization of the physical models, which will appeal to readers who are more

familiar with sampled-data control system. Soft sensors and observers will be discussed for low cost implementation. Resonant control of the electric drives and power supply will be discussed to deal with the problems of bias in sensors and unbalanced three phase AC currents. Brings together both classical control systems and predictive control systems in a logical style from introductory through to advanced levels Demonstrates how simulation and experimental results are used to support theoretical analysis and the proposed design algorithms MATLAB and Simulink tutorials are given in each chapter to show the readers how to take the theory to applications. Includes MATLAB and Simulink software using xPC Target for teaching purposes A companion website is available Researchers and industrial engineers; and graduate students on electrical engineering courses will find this a valuable resource.

This book is intended as a supplement for undergraduate courses in Kinematics or Dynamics of Mechanisms, taught in Mechanical Engineering departments. As a MATLAB® supplement, it can be used with any standard textbook, including Norton's DESIGN OF MACHINERY Second Edition, Erdman/Sandor's MECHANISMS DESIGN, Third Edition, or Mabie/Reinholtz MECHANISMS AND DYNAMICS OF MACHINERY, Fourth Edition. The emphasis of the text is integrating the computational power of MATLAB® into the analysis and design of mechanisms. This new book in Brooks/Cole's Bookware Companion Series™ is the first to apply the use of MATLAB® to the study of kinematics and dynamics of mechanisms. This book is intended as a useful guide for readers interested in understanding kinematics, or as a reference for practicing mechanical engineers. It provides detailed instruction and examples showing how to use MATLAB® (increasingly, the software program of choice among engineers for complex computations) and its accompanying simulation environment, SIMULINK®, to develop powerful and accurate computer simulations of constrained mechanical systems.

Automatic Control of Atmospheric and Space Flight Vehicles is perhaps the first book on the market to present a unified and straightforward study of the design and analysis of automatic control systems for both atmospheric and space flight vehicles. Covering basic control theory and design concepts, it is meant as a textbook for senior undergraduate and graduate students in modern courses on flight control systems. In addition to the basics of flight control, this book covers a number of upper-level topics and will therefore be of interest not only to advanced students, but also to researchers and practitioners in aeronautical engineering, applied mathematics, and systems/control theory.

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Building on MATLAB (the language of technical computing), Simulink provides a platform for engineers to plan, model, design, simulate, test and implement complex electromechanical, dynamic control, signal processing and communication systems. Simulink-Matlab combination is very useful for developing algorithms, GUI assisted creation of block diagrams and realisation of interactive simulation based designs. The eleven chapters of the book demonstrate the power and capabilities of Simulink to solve engineering problems with varied degree of complexity in the virtual environment.

This textbook is intended for a semester-length course in Sigma-Delta converters. The author minimizes his use of mathematical theory, emphasizes real-use cases, and discusses concepts in a way to be accessible to inexperienced students and entry-level, practicing engineers. Little or no prior knowledge of Sigma-Delta converters and/or MATLAB/Simulink is assumed.

Readers will learn what the design process involves, the trade-offs to consider, how a modulator is actually simulated and how to consider a specific design successful. Each chapter begins with the essential, practical information, while the necessary, theoretical concepts are

presented through results evaluation of the suggested simulation exercises of the modulators supplied in the MATLAB/Simulink Toolbox software accompanying this book.

"Discusses the essential concepts of power electronics through MATLAB examples and simulations"--

MATLAB is a popular program. A MATLAB website states ζ Over 1,000,000 engineers and scientists ζ .use MATLAB and Simulink. ζ Monster.com has hundreds of advertisements for jobs requiring MATLAB. The first purpose of this book is to quickly teach an electrical engineer or technologist how to use MATLAB. The reader learns by example. Complete keystroke-to-keystroke details are provided for problem solution and documentation. Most of this book ζ s examples demonstrate MATLAB ζ s abilities as a stand-alone programming language for performing numeric electrical computations. Also, two MathWorks add-on programs are demonstrated, the Optimization Toolbox, and Simulink. The second purpose of this book is to demonstrate MATLAB solutions of practical electrical problems. The simplest and most basic uses of MATLAB are in the first examples. Later examples demonstrate more complex capabilities. The reader could use the examples ζ solutions as starting models for his own programs. It is assumed that the reader has an analytical electrical background of the sort that would be gained in a university electrical engineering or electrical engineering technology program. MATLAB is available in a free 30 day Demonstration version. Its key features can be learned in 30 days.

MATLAB is a computer-based system designed primarily to assist the academic, research and industrial communities in solving complex technical problems. It is one of the leading software packages for carrying out programming and numerical computations. SIMULINK (Simulation and Link) is a tool integrated within MATLAB to facilitate high-tech solutions to various engineering and scientific problems. This book closes the gap between the software package and its users so that they can succeed easily in today's competitive world. It provides the reader with the requisite understanding of these computational and block diagram environments which may further enhance employment opportunities for professionals in science and various engineering streams.

MATLAB is an indispensable asset for scientists, researchers, and engineers. The richness of the MATLAB computational environment combined with an integrated development environment (IDE) and straightforward interface, toolkits, and simulation and modeling capabilities, creates a research and development tool that has no equal. From quick code prototyping to full blown deployable applications, MATLAB stands as a de facto development language and environment serving the technical needs of a wide range of users. As a collection of diverse applications, each book chapter presents a novel application and use of MATLAB for a specific result.

MATLAB can be used to execute many mathematical and engineering calculations, as well as a handheld computer can if not better. Moreover, like many other computer languages, it can perform tasks that a handheld computer cannot. Compared to other computer languages, MATLAB provides many built-in functions that make learning easier and reduce prototyping time. Simulink is a toolbox that extends the possibilities of MATLAB by providing a graphical interface for modeling and simulating dynamical processes. Using examples from mathematics, mechanical and electrical engineering, and ζ control and signal processing, What Every Engineer Should Know About MATLAB and Simulink provides an introduction to these two computer environments and examines the advantages and limitations of MATLAB. It first explores the benefits of how to use MATLAB to solve problems and then process and present calculations and experimental results. This book also briefly introduces the reader to more advanced features of the software, such as object-oriented programming (OOP), and it draws the attention to some specialized toolboxes. Key features of the book include demonstrations of how to: Visualize the results of calculations in various kinds of graphical representations

Write useful script files and functions for solving specific problems Avoid disastrous computational errors Convert calculations into technical reports and insert calculations and graphs into either MS Word or LaTeX This book illustrates the limitations of the computer, as well as the implications associated with errors that can result from approximations or numerical errors. Using selected examples of computer-aided errors, the author explains that the set of computer numbers is discrete and bounded a feature that can cause catastrophic errors "Engineering Computations and Modeling in MATLAB/Simulink" provides a broad overview of The

MATLAB is a software package for high-performance computation. Combined with Simulink, this is a de-facto industry standard for the analysis, modelling and visualising of complex systems. This comprehensive textbook is ideal for engineers, scientists and those in the financial sector who want to grasp the essence of systems modelling and computation. This MATLAB exercise book accompanies the textbook Control Engineering, providing a platform for students to practice problem solving in the analysis and design of continuous and discrete control problems reflected in the main textbook. The book starts off with a brief introduction to MATLAB, control toolbox and Simulink. Subsequent chapters include a short theoretical summary of the topic followed by exercises on solving complex problems using MATLAB commands. These exercises are ideal for students in computer laboratory classes. Employ essential and hands-on tools and functions of the MATLAB and Simulink packages, which are explained and demonstrated via interactive examples and case studies. This book contains dozens of simulation models and solved problems via m-files/scripts and Simulink models which help you to learn programming and modeling essentials. You'll become efficient with many of the built-in tools and functions of MATLAB/Simulink while solving engineering and scientific computing problems. Beginning MATLAB and Simulink explains various practical issues of programming and modelling in parallel by comparing MATLAB and Simulink. After reading and using this book, you'll be proficient at using MATLAB and applying the source code from the book's examples as templates for your own projects in data science or engineering. What You Will Learn Get started using MATLAB and Simulink Carry out data visualization with MATLAB Gain the programming and modeling essentials of MATLAB Build a GUI with MATLAB Work with integration and numerical root finding methods Apply MATLAB to differential equations-based models and simulations Use MATLAB for data science projects Who This Book Is For Engineers, programmers, data scientists, and students majoring in engineering and scientific computing.

A comprehensive text, combining all important concepts and topics of Electrical Machines and featuring exhaustive simulation models based on MATLAB/Simulink Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink provides readers with a basic understanding of all key concepts related to electrical machines (including working principles, equivalent circuit, and analysis). It elaborates the fundamentals and offers numerical problems for students to work through. Uniquely, this text includes simulation models of every type of machine described in the book, enabling students to design and analyse machines on their own. Unlike other books on the subject, this book meets all the needs of students in electrical machine courses. It balances analytical treatment, physical explanation, and hands-on examples and models with a range of difficulty levels. The authors present complex ideas in simple, easy-to-understand language, allowing students in all engineering disciplines to build a solid foundation in the principles of electrical machines. This book: Includes clear elaboration of fundamental concepts in the area of electrical machines, using simple language for optimal and enhanced learning Provides wide coverage of topics, aligning with the electrical machines syllabi of most international universities Contains extensive numerical problems and offers MATLAB/Simulink simulation models for the covered machine types Describes MATLAB/Simulink modelling procedure and introduces the modelling environment to novices

Covers magnetic circuits, transformers, rotating machines, DC machines, electric vehicle motors, multiphase machine concept, winding design and details, finite element analysis, and more Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink is a well-balanced textbook perfect for undergraduate students in all engineering majors. Additionally, its comprehensive treatment of electrical machines makes it suitable as a reference for researchers in the field.

"This book begins by covering the fundamentals of MATLAB programming and applications, and the solutions to different mathematical problems in simulation. The fundamentals of Simulink modelling and simulation are then presented, followed by coverage of intermediate level modelling skills and more advanced techniques in Simulink modelling and applications. Finally the modelling and simulation of engineering and non-engineering systems are presented. The areas covered include electrical and electronic systems, mechanical systems, pharmacokinetic systems, video and image processing systems and discrete event systems. Hardware-in-the-loop simulation and real-time application are also discussed."(source : 4ème de couverture).

These days, nearly all the engineering problem are solved with the aid of suitable computer packages. This book shows how MATLAB/Simulink could be used to solve state-space control problems. In this book, it is assumed that you are familiar with the theory and concepts of state-space control, i.e., you took or you are taking a course on state-space control system and you read this book in order to learn how to solve state-space control problems with the aid of MATLAB/Simulink. The book is composed of three chapters. Chapter 1 shows how a state-space mathematical model could be entered into the MATLAB/Simulink environment. Chapter 2 shows how a nonlinear system could be linearized around the desired operating point with the aid of tools provided by MATLAB/Simulink. Finally, Chapter 3 shows how a state-space controller could be designed with the aid MATLAB and be tested with Simulink. The book will be useful for students and practical engineers who want to design a state-space control system.

MATLAB® can be used to execute many mathematical and engineering calculations, as well as a handheld computer can—if not better. Moreover, like many other computer languages, it can perform tasks that a handheld computer cannot. Compared to other computer languages, MATLAB provides many built-in functions that make learning easier and reduce prototyping time. Simulink® is a toolbox that extends the possibilities of MATLAB by providing a graphical interface for modeling and simulating dynamical processes. Using examples from mathematics, mechanical and electrical engineering, and control and signal processing, *What Every Engineer Should Know About MATLAB® and Simulink®* provides an introduction to these two computer environments and examines the advantages and limitations of MATLAB. It first explores the benefits of how to use MATLAB to solve problems and then process and present calculations and experimental results. This book also briefly introduces the reader to more advanced features of the software, such as object-oriented programming (OOP), and it draws the attention to some specialized toolboxes. Key features of the book include demonstrations of how to: Visualize the results of calculations in

various kinds of graphical representations Write useful script files and functions for solving specific problems Avoid disastrous computational errors Convert calculations into technical reports and insert calculations and graphs into either MS Word or LaTeX This book illustrates the limitations of the computer, as well as the implications associated with errors that can result from approximations or numerical errors. Using selected examples of computer-aided errors, the author explains that the set of computer numbers is discrete and bounded—a feature that can cause catastrophic errors if not properly taken into account. In conjunction with The Mathworks—marketers of MATLAB and Simulink—a supplementary website is presented to offer access to software implemented in the book and the script files used to produce the figures. This book was written by Adrian B. Biran of Technion -- Israel Institute of Technology, with contributions by Moshe Breiner, managing director of SimACon.

Employ the essential and hands-on tools and functions of MATLAB's ordinary differential equation (ODE) and partial differential equation (PDE) packages, which are explained and demonstrated via interactive examples and case studies. This book contains dozens of simulations and solved problems via m-files/scripts and Simulink models which help you to learn programming and modeling of more difficult, complex problems that involve the use of ODEs and PDEs. You'll become efficient with many of the built-in tools and functions of MATLAB/Simulink while solving more complex engineering and scientific computing problems that require and use differential equations. Practical MATLAB Modeling with Simulink explains various practical issues of programming and modelling. After reading and using this book, you'll be proficient at using MATLAB and applying the source code from the book's examples as templates for your own projects in data science or engineering. What You Will Learn Model complex problems using MATLAB and Simulink Gain the programming and modeling essentials of MATLAB using ODEs and PDEs Use numerical methods to solve 1st and 2nd order ODEs Solve stiff, higher order, coupled, and implicit ODEs Employ numerical methods to solve 1st and 2nd order linear PDEs Solve stiff, higher order, coupled, and implicit PDEs Who This Book Is For Engineers, programmers, data scientists, and students majoring in engineering, applied/industrial math, data science, and scientific computing. This book continues where Apress' Beginning MATLAB and Simulink leaves off. The subject matter of this book is to present the procedural steps required for modeling and simulating the basic dynamic system problems in SIMULINK (a supplementary part of MATLAB) which follow some definitive model. However, the key features of the text can be cited as follows: The book is on the whole a guiding tool for the undergraduate and graduate students of science and engineering who want to work out or simulate the classroom modeling problems using SIMULINK To check the understanding of SIMULINK output and deliberate the reliability on SIMULINK, analytical solutions of the model outputs are inserted in most chapters Since the text presents modeling ranging from elementary to

advanced level, audience spectrum of the text includes engineers, teachers, researchers, and scientists who are beginners in using SIMULINK Know-how aspects of SIMULINK are covered in a made-easy way so that the average reader becomes benefited even if starting from the scratch Tabular block links at the end of each chapter required for a particular class of problems help the reader bring them in the model file and simulate quickly Over 300 classroom-modeling examples are simulated with clarity and systematic steps Appropriate for individual or classroom exercise There are ten chapters in the book bearing the following titles: Introduction to SIMULINK Modeling Mathematical Functions and Waves Modeling Ordinary Differential Equations Modeling Difference Equations Modeling Common Problems of Control Systems Modeling Some Signal Processing Problems Modeling Common Matrix Algebra Problems Modeling Common Statistics and Conversion Problems Fourier Analysis Problems Miscellaneous Modeling and Some Programming Issues

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