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- **The MathWorks - Nonlinear Control Design Blockset** - The Nonlinear Control Design Blockset provides a time-domain-based optimization approach to system design. This tool, designed for use with Simulink® block diagrams, automatically tunes parameters based on user-defined time-domain performance constraints.
- **MathWorks Instrument Control Toolbox** - Provides features for communicating with data acquisition devices and instruments, such as spectrum analyzers, oscilloscopes, and function generators. Support is provided for GPIB (IEEE-488, HPIB) and VISA communication protocols. You can generate data in MATLAB to send out to an instrument or read data into MATLAB for analysis and visualization.
- **MathWorks Model Predictive Control Toolbox** - The Model Predictive Control Toolbox is a complete set of tools for implementing model predictive control strategies. These techniques were developed to address the practical issues associated with the control of large, multivariable processes where there are constraints on the manipulated and controlled variables. Model predictive control methods are typically used in chemical engineering and other continuous process control industries.
- **MathWorks Control System Toolbox** - The Control System Toolbox is a collection of MATLAB functions for modeling, analyzing, and designing automatic control systems. The functions in this Toolbox implement mainstream classical and modern control techniques. With the Control System Toolbox, you can analyze and simulate both continuous-time and discrete-time linear dynamic systems. The graphical user interfaces allow you to quickly compute and graph time responses, frequency responses, and root-locus diagrams.
- **MathWorks LMI Control Toolbox** - The LMI (linear matrix inequality) Control Toolbox provides a fully integrated general purpose environment for specifying and solving LMI problems. Its powerful and user-friendly design allows you to develop your own customized tools and applications. While the Toolbox's emphasis is on control design, its LMI capabilities make it useful anywhere LMI techniques are applicable.
- **MathWorks Mu-Analysis and Synthesis Toolbox** - The µ-Analysis and Synthesis Toolbox contains functions for performing robust control design using H optimal control and the structured singular value, µ. Version 3 features a GUI that aids in the manipulation of block structures for the design of H controllers using approximate µ-synthesis with automatic D-K interations.
- **MathWorks Robust Control Toolbox** - The Robust Control Toolbox provides tools for the design and analysis of multivariable control systems where robustness is a concern. This includes systems where there may be modeling errors, dynamics that are not completely known, or parameters that can vary during the lifespan of the product. The powerful algorithms in this toolbox allow you to perform complex calculations while considering a number of parameter variations.
- **MathWorks System Identification Toolbox** - The System Identification Toolbox provides tools for creating mathematical models of dynamic systems based on observed input/output data. The Toolbox features a flexible graphical user interface that aids in the organization of data and models. The identification techniques provided with this Toolbox are useful for applications ranging from control system design and signal processing to time-series analysis and vibration analysis.
- The KALMTOOL Toolbox - The KALMTOOL toolbox - State estimation for nonlinear

systems. The toolbox contains functions for extended Kalman filtering and for two new derivative-free state estimators.

- System Identification M-files (5.x) m-file
- System Identification M-files (4.2) m-file
- Control System M-files (5.x) m-file
- Control System M-files (4.2) m-file
- Toolbox for Parametric Robust Control - If you are looking for a CACSD tool for linear parameter varying (LPV) systems, then you are at the right place. PARADISE is a toolbox based on Matlab. It is a flexible and efficient tool for the design and analysis of robust control systems: Parametric models can be specified using Simulink. A closed loop symbolic representation of the control system will be generated automatically using symbolic computation. The parameter space approach and various derivatives can be applied to this parametric model. Graphical user interfaces guide you through design and analysis.
- CTM Control Tutorials for Matlab - There are many different toolboxes available which extend the basic functions of Matlab into different application areas; in these tutorials, we will make extensive use of the Control Systems Toolbox. Matlab is supported on Unix, Macintosh, and Windows environments; a student version of Matlab is available for personal computers.
- Defining Transfer Functions in Matlab - Tutorial how to define transfer functions in both the polynomial form and Linear Time Invariant (LTI) System Object.
- Eigenstructure Assignment Toolbox - The Eigenstructure Assignment Toolbox has been specially written to enable control system designers to have flexibility in the choice of design strategy, whilst at the same time providing an opportunity for a tutorial introduction to eigenstructure assignment. This toolbox enables eigenstructure assignment for continuous and discrete linear time-invariant state-space systems to be achieved with MATLAB using many of the methods and algorithms developed in recent years.
- ELEC440 MATLAB resources - A set of M-files have been developed by Dorf and Bishop to supplement their textbook Modern Control Systems, 7th edition. The complete collection of these short scripts is available for cutting-and-pasting into the MATLAB command line.
- Ezera toolbox - EZera is a gui set of routines to easily create a state space realization of an LTI system from a set of measured frequency response functions (frfs). The method is based on the Eigenstructure Realization Algorithm (ERA). Requires signal processing toolbox.
- Introduction to Control System Toolbox - This free text is an easy-to-use tutorial to MATLAB's Control System Toolbox, leading you through all of the important tools for model definition and system analysis and design. The text is self-instructive: You are asked to perform a number of simple tasks through which you will learn to master this toolbox, and the expected responses are even shown in the text.
- l1-Identification Toolbox - The l1-identification toolbox for Matlab (version 4) is a set of functions for l1-identification, validation and estimation of uncertainty of discrete dynamic models based on linear programming.
- MATLAB-Hysys interface. - A toolbox for using Matlab as an activeX/COM controller for Hysys.
- PolePack - In this Package we solve the Pole Placement problem associated with several Dynamic systems. More specifically we solve the Pole Placement problem for Multi and Single-input, Descriptor and nonDescriptor systems using State and Output Feedback. The Eigenstructure Assignment problem is also solved for Descriptor Systems using State Feedback. There are also programs that compute Controllability forms for some of the above systems as well as the Distances from the nearest uncontrollable systems. A readme.txt and a demo.m file may also be found in the package.
- Polynomial Toolbox - The Polynomial Toolbox is the MATLAB® toolbox for polynomials, polynomial matrices and their applications in systems, signals and control. It features over 222 macros for polynomials and polynomial matrices, objects, overloaded operations, functions, equation solvers, GUI, graphics, new generation of numerical algorithms: easy, fast, reliable, system and signal models based on polynomial matrix fractions, analysis and design tools for control and filters, classical, optimal and robust design.
- RIOTS: The Most Powerful Optimal Control Problem Solver - RIOTS is a group of programs and utilities, written mostly in C and designed as a toolbox for Matlab, that provides an interactive environment for solving a very broad class of finite-horizon optimal multi-variable control problems. This class includes problems with: * Lagrange, Bolza and Mayer type objective functions * Linear or Nonlinear dynamics * Min-Max objective functions * Free final time problems * Variable initial conditions * Endpoint equality and inequality constraints *

Trajectory inequality constraints on the states and controls * Simple bounds on the controls and free initial conditions

- Robot Manipulator Toolbox - Currently there are 3 matlab toolboxes for robotics * CorkeTools: Peter Corke's toolbox (see documents listed below) * BrunoTools: Matlab code supplied by the textbook authors. * 4014Tools: A couple of routines from last year's robotics unit. All of these toolboxes should appear automatically when you start up MATLAB. (Type help when you enter matlab). The help submenus (eg help CorkeTools) should list the functions in each toolbox.
- Robotics Toolbox - This toolbox provides many functions that are useful in robotics such as kinematics, dynamics, and trajectory generation. The toolbox is useful for simulation as well as analyzing results from experiments with real robots. The toolbox is based on a very general method of representing the kinematics and dynamics of serial-link manipulators and models are provided for well known robots such as the Puma 560 and the Stanford arm.
- Stability Test of Zeros in Sampled Systems - This software computes the sampling period when a continuous time system is discretized by a sampler and zero-order hold.

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