

1

INTRODUCTION

1.1 THE CONTROL SYSTEM

The control system is that means by which any quantity of interest in a machine, mechanism or other equipment is maintained or altered in accordance with a desired manner. Consider, for example, the driving system of an automobile. Speed of the automobile is a function of the position of its accelerator. The desired speed can be maintained (or a desired change in speed can be achieved) by controlling pressure on the accelerator pedal. This automobile driving system (accelerator, carburettor and engine-vehicle) constitutes a control system. Figure 1.1 shows the general diagrammatic representation of a typical control system. For the automobile driving system the input (command) signal is the force on the accelerator pedal which through linkages causes the carburettor valve to open (close) so as to increase or decrease fuel (liquid form) flow to the engine bringing the engine-vehicle speed (controlled variable) to the desired value.



Fig. 1.1. The basic control system.

The diagrammatic representation of Fig. 1.1 is known as *block diagram* representation wherein each block represents an element, a plant, mechanism, device etc., whose inner details are not indicated. Each block has an input and output signal which are linked by a relationship characterizing the block. It may be noted that the signal flow through the block is unidirectional.

Nagrath Control Systems Engineering

P.N. Paraskevopoulos



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Control Systems (As Per Latest Jntu Syllabus) I. J. Nagrath, Madan Gopal, 2009 Focuses on the first control systems course of B.Tech JNTU this book helps the student prepare for further studies in modern control system design It offers a profusion of examples on various aspects of study

Control Systems Engineering I. J. Nagrath, Madan Gopal, 1984

Control Systems Engineering I. GOPAL J NAGRATH (M.), M. Gopal, 2020-10 Key Features Examples have been provided to maintain the balance between different disciplines of engineering Robust control Robotic control and Robotic modeling introduced PID learning procedures illustrated Updation of obsolete technology with examples State variable formulation and design simplified Digital control both classical and modern approaches covered in depth Chapters on Nonlinear Systems Adaptive Fuzzy Logic and Neural Network Control included An appendix in MATLAB with examples from time and frequency domain analysis and design included About the Book The book provides an integrated treatment of continuous and discrete time systems for two courses at undergraduate level or one course at postgraduate level The stress is on the interdisciplinary nature of subject and examples have been drawn from various engineering disciplines to illustrate the basic system concepts A strong emphasis is laid on modeling of practical systems involving hardware control components of a wide variety are comprehensively covered Time and frequency domain techniques of analysis and design of control systems have been exhaustively treated and their interrelationship established Adequate breadth and depth is made available for second course The coverage includes digital control systems analysis stability and classical design state variables for both continuous and discrete time systems observers and pole placement design Liapunov stability optimal control and recent advances in control systems adaptive control fuzzy logic control neural network control

CONTROL SYSTEM ENGINEERING I. J. Nagrath, 1999

Modern Control System Theory M. Gopal, 1993 About the book The book provides an integrated treatment of continuous time and discrete time systems for two courses at postgraduate level or one course at undergraduate and one course at postgraduate level It covers mainly two areas of modern control theory namely system theory and multivariable and optimal control The coverage of the former is quite exhaustive while that of latter is adequate with significant provision of the necessary topics that enables a research student to comprehend various technical papers The stress is on interdisciplinary nature of the subject Practical control problems from various engineering disciplines have been drawn to illustrate the potential concepts Most of the theoretical results have been presented in a manner suitable for digital computer programming along with the necessary algorithms for numerical computations

Modern Control Systems Saurabh Mani Tripathi, 2008 Providing a lucid introduction to modern control systems topics this book has been designed as a short course on control systems or as a review for the professional engineer Five chapters have been written to emphasize concepts provide basic mathematical derivations CD ROM with MATLAB applications included

Modern Control Engineering P.N. Paraskevopoulos, 2017-12-19 Illustrates the analysis behavior and design of linear control systems using

classical modern and advanced control techniques Covers recent methods in system identification and optimal digital adaptive robust and fuzzy control as well as stability controllability observability pole placement state observers input output decoupling and model matching *Textbook Of Control Systems Engineering (Vtu)* I. J. Nagrath, Madan Gopal, 2008

Control Systems Engineering S. K. Bhattacharya, 2008-09 Control Systems Engineering is a comprehensive text designed to cover the complete syllabi of the subject offered at various engineering disciplines at the undergraduate level The book begins with a discussion on open loop and closed loop control systems The block diagram representation and reduction techniques have been used to arrive at the transfer function of systems The signal flow graph technique has also been explained with the same objective This book lays emphasis on the practical applications along with the explanation of key concepts **Control Systems Engineering Using Matlab** S N Sivanandam, 2009-11-01 Control Systems Engineering using MATLAB provides students with a concise introduction to the basic concepts in automatic control systems and the various methods of solving its problems Designed to comfortably cover two academic semesters the style and form of the book makes it easily comprehensible for all engineering disciplines that have control system courses in their curricula The solutions to the problems are programmed using MATLAB 6 0 for which the simulated results are provided The MATLAB Control Systems Toolbox is provided in the Appendix for easy reference The book would be useful as a textbook to undergraduate students and as quick reference for higher studies

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