Predictive Control of Power Converters and Electrical Drives. Wiley - IEEE

Description:

Describes the general principles and current research into Model Predictive Control (MPC); the most up-to-date control method for power converters and drives.

The book starts with an introduction to the subject before the first chapter on classical control methods for power converters and drives. This covers classical converter control methods and classical electrical drives control methods. The next chapter on Model predictive control first looks at predictive control methods for power converters and drives and presents the basic principles of MPC. It then looks at MPC for power electronics and drives. The third chapter is on predictive control applied to power converters. It discusses: control of a three-phase inverter; control of a neutral point clamped inverter; control of an active front end rectifier; and; control of a matrix converter. In the middle of the book there is Chapter four - Predictive control applied to motor drives. This section analyses predictive torque control of industrial machines and predictive control of permanent magnet synchronous motors. Design and implementation issues of model predictive control is the subject of the final chapter. The following topics are described in detail: cost function selection; weighting factors design; delay compensation; effect of model errors, and prediction of future references. While there are hundreds of books teaching control of electrical energy using pulse width modulation, this will be the very first book published in this new topic.

- Unique in presenting a completely new theoretic solution to control electric power in a simple way
- Discusses the application of predictive control in motor drives, with several examples and case studies
- Matlab is included on a complementary website so the reader can run their own simulations

Contents:

Foreword xi
Preface xiii
 Acknowledgments xv
Part One INTRODUCTION
1 Introduction 3
1.1 Applications of Power Converters and Drives 3
1.2 Types of Power Converters 5
1.2.1 Generic Drive System 5
1.2.2 Classification of Power Converters 5
1.3 Control of Power Converters and Drives 7
1.3.1 Power Converter Control in the Past 7
1.3.2 Power Converter Control Today 10
1.3.3 Control Requirements and Challenges 11
1.3.4 Digital Control Platforms 12
1.4 Why Predictive Control is Particularly Suited for Power Electronics 13
1.5 Contents of this Book 15

References 16
Part Four DESIGN AND IMPLEMENTATION ISSUES OF MODEL PREDICTIVE CONTROL

10 Cost Function Selection 147
10.1 Introduction 147
10.2 Reference Following 147
10.2.1 Some Examples 148
10.3 Actuation Constraints 148
10.3.1 Minimization of the Switching Frequency 150
10.3.2 Minimization of the Switching Losses 152
10.4 Hard Constraints 155
10.5 Spectral Content 157
10.6 Summary 161
References 161

11 Weighting Factor Design 163
11.1 Introduction 163
11.2 Cost Function Classification 164
11.2.1 Cost Functions without Weighting Factors 164
11.2.2 Cost Functions with Secondary Terms 164
11.2.3 Cost Functions with Equally Important Terms 165
11.3 Weighting Factors Adjustment 166
11.3.1 For Cost Functions with Secondary Terms 166
11.3.2 For Cost Functions with Equally Important Terms 167
11.4 Examples 168
11.4.1 Switching Frequency Reduction 168
11.4.2 Common-Mode Voltage Reduction 168
11.4.3 Input Reactive Power Reduction 170
11.4.4 Torque and Flux Control 170
11.4.5 Capacitor Voltage Balancing 174
11.5 Summary 175
References 176

12 Delay Compensation 177
12.1 Introduction 177
12.2 Effect of Delay due to Calculation Time 177
Index 227

Ordering:

Order Online - http://www.researchandmarkets.com/reports/2181975/

Order by Fax - using the form below

Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

Product Name: Predictive Control of Power Converters and Electrical Drives. Wiley - IEEE
Web Address: http://www.researchandmarkets.com/reports/2181975/
Office Code: SCDVVBXJ

Product Format
Please select the product format and quantity you require:

Quantity
Hard Copy (Hard Back): USD 123 + USD 28 Shipping/Handling

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

Title: Mr □ Mrs □ Dr □ Miss □ Ms □ Prof □
First Name: __________________________ Last Name: __________________________
Email Address: * __________________________
Job Title: __________________________
Organisation: __________________________
Address: __________________________
City: __________________________
Postal / Zip Code: __________________________
Country: __________________________
Phone Number: __________________________
Fax Number: __________________________

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:
Marketing Code: ______________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World