

# Index

## A

- adaptation error
- adaptation gain
  - choice of
  - constant
  - constant trace
  - decreasing
  - initial
- air heater
  - digital control of a
  - identification of a
- algorithm
  - parameter adaptation
  - gradient
  - recursive estimation
- analysis
  - frequency domain
  - time domain
- anti-aliasing filter
- anti-saturation (device)
- adaptive control
  - direct
  - indirect
- ARMAX
- autocorrelation
  - function
  - normalized
- a posteriori* prediction error
- a priori* prediction error
- aliasing
- analog to digital converter

## B

- bandwidth
- bias
- backward shift operator

## C

- closed loop identification
- closed loop input error
  - method (controller estimation)
- closed loop output error
  - extended
  - method (identification)
  - with filtering
- complexity reduction of controllers
  - direct
  - indirect
- computational delay
- computer control
- confidence interval

- constant trace (see also adaptation gain)
- continuous-time system
- converter
  - analog-to-digital
  - digital-to-analog
- contraction factor
- control
  - cascade
  - internal model
  - position
  - with independent objectives
- convergence domain
- covariance (see also correlation functions)
- criterion
  - stability
  - validation practice
  - validation
  - Nyquist stability
- cross-correlation test
- cut-off frequency

## D

- damping factor
- data acquisition
- dc component
  - elimination of
- dc motor
  - control
  - identification
- delay operator (see also backward shift operator)
- derivative action
- desired performances
- differences equation
- differential equation
- digital controller
  - rst
  - pi
  - pid
  - time domain design
- digital integrator
- digital to analog converter
- Dirac pulse
- discrete-time
  - normalized
  - systems
  - white noise
- discretization
- discretized system (process)
- distillation column identification
- disturbance model

## E

- equation
  - difference
  - differential
  - error

- recursive
- ergodic
- error
  - adaptation
  - equation method
  - closed loop input
  - closed loop output
  - output
  - output (residual) prediction
  - output with extended prediction model
  - prediction
  - residual prediction
  - static
- estimation
  - model complexity
  - parameter
  - reduced order controller
- extended least squares

## F

- filtering
  - anti-aliasing
  - of data
  - of derivative action
- final value
- flexible robot
- flexible transmission
- forgetting factor
  - fix
  - variable
- frequency
  - complex
  - domain
  - Nyquist
  - response
  - sampling
- functions
  - matlab
  - scilab

## G

- gap
- gain
  - adaptation
  - decreasing
  - initial
  - in continuous-time
  - in discrete-time
  - proportional
  - static
- galvanisation
- gauss bell
- gaussian
- generalized least squares
- generalized output

gradient algorithm  
improved

## I

identification  
  methods type i  
  methods type ii  
    recursive  
    real time  
  non recursive  
impulse response  
independence test  
initialization horizon  
input sequence  
  choice of the  
instrumental variable  
  method (identification)  
  with auxiliary model  
  with delayed observations  
integral action  
internal model control  
  partial

## L

laboratory sessions  
  digital pid  
  digital controller  
  discrete-time systems  
  identification  
linear quadratic control

## M

margin  
  delay  
  gain  
  generalized stability  
  modulus  
  phase  
matrix  
  inversion lemma  
  definite positive  
mean value  
  removal of the  
measurement functions  
model  
  adjustable  
  adjustable prediction  
  continuous-time  
  control oriented  
  discrete-time  
  discrete-time (adjustable)  
  discrete-time with hold  
  dynamic  
  first order

- frequency domain
- general form
- knowledge type
- non parametric
- of disturbances
- of stochastic disturbances
- parametric
- prediction
- second order
- model validation
  - for type I methods
  - for type II methods
- moving average (see also process)

## N

- natural frequency
- [non recursive identification](#)
- normalized covariance
- Nyquist
  - criterion
  - frequency
  - plot

## O

- observations vector
- open loop
- order estimation
- output error
  - extended (closed loop)
  - method (identification)
  - predictor
  - residual
    - with extended prediction model
    - with fixed compensator
    - with filtered observations
- overshoot (maximum)

## P

- parameter estimation vector
- parametric estimation
- parameter adaptation algorithm (PAA)
- [performance specifications](#)
- pi controller
  - analog
  - digital
- pid controller
  - analog
  - digital
    - [pid 1](#)
    - [pid 2](#)
- pole placement
- poles
- positive definite matrix
- practical aspects

- prediction error
  - a posteriori
  - a priori
  - residual
- predictive control
  - one step ahead
  - long range
- probability density
- probability distribution function
- process
  - AR
  - ARMA
  - ARMAX
  - MA
  - stochastic
- pseudo random binary sequence (prbs)
- pulse transfer operator

## R

- Ramp
- random
  - disturbance
  - variable
- real time identification
- recursive
  - equation
  - estimation algorithm
  - form
    - identification
  - least squares
  - maximum likelihood
- reduced order controller estimation
- regulation
- residual prediction error
- resonance factor
- rise time
- robustness
- rst controller

## S

- sampled data system with hold
  - first order
  - model of a
  - second order
- sampled signal spectrum
- sampling frequency
- choice of the
- saturation (effect of )
- scaling
- sensitivity function
  - complementary
  - input
  - noise-output
  - output

- settling time
- shift operator
- simulation
- software
- spectral density
- spectrum aliasing
- s-plane
- stability
  - asymptotic
  - discrete-time
  - domain of
  - test of
- stability margin
  - generalized
- standard deviation
- state-space
- state observer
- steady state error
  - in continuous-time
  - in discrete-time
  - null
- step
- stochastic disturbances
  - [effect on identification](#)
- stochastic process
  - ergodic
  - gaussian
  - realization
- stochastic variable
  - independent
- system identification
  - closed loop
  - closed loop output error
  - in real time
  - of a flexible transmission
  - of a flexible robot
  - of a dc motor
  - of a distillation column
  - of a plant with an integrator
  - of an air heater
  - practical aspects
  - recursive parameter
- system
  - in cascade
  - in closed loop
  - in open loop
  - sampled

## T

- time constant
- time delay
  - computation of
  - continuous-time
  - discrete-time
  - fractional
  - pure time delay

- system with
- time domain
- time domain response
- tracking
  - of the control signal (closed loop)
  - of the output (closed loop)
- tracking and regulation
  - generalized minimum variance
  - minimum variance**
  - with independent objectives
- transfer function
  - continuous
  - pulse
  - strictly positive real

## U

- U-D factorization
- unit circle

## V

- validation
  - closed loop
  - criterion
  - test
- variance
- vector
  - parameter
  - observations
- vinnicombe gap

## W

- white noise
  - gaussian
  - discrete time
- whiteness test

## Y

- Youla-Kučera parametrization

## Z

- zero order hold
- zeros
  - stable
  - unstable
- z-plan
- z-transform