System Control Review

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Review (1)

1. **Some examples of control systems**
2. **Key concepts**
   Systems, control, dynamic system, linear/nonlinear
   Analysis, design, synthesis
   Openloop control, feedback control systems
3. **Laplace Transformation**
4. **System representations**
   Block diagram, signal flow graph
   Mason's gain rule
5. **System responses**
   Transient response, steady state response, pole/zero,
   System types, static error/velocity error/acceleration error constants ,
   Stability, Routh stability tests
6. **Basic control algorithms**
   On-off control, PID control, openloop/closed loop control and modeling error
7. **Root Locus analysis and design method**
   lead-lag compensator
   parameter variations

Review (2)

8. Frequency response method

Bode plots, Nyquist plot, Nyquist stability criterion
Gain margin, phase margin,
Robustness to model uncertainties

9. State space method

state feedback and pole placements
solution of state equation, state transition matrix
(discrete systems)
Regulator
reference tracking
integral control
Controllability, observability, Cayley-Hamilton theorem
Observer design, observer-controller,
Separation property

10. Design Examples (state space design)

Inverted bar(pendulum) control, PID
(Vehicle control systems) (path tracking)