11/3/09

Control

Exam

1) Basic digital
- Sampling
- Difference eqns - FIR, FSR
- Basic dynamics - mix of digital and continuous
- Emulation Techniques - Tustin's method, matched pole zero

2) Digital Control
- $G(z)$, $G_m(z)$
- Inverse model approach
- Root locus design

3) System Identification
- Least squares — unseen proof
- Recursive least squares
- Pole placement

4) Basics of state space
- Standard proofs - TF ↔ SS, matrix exponential $\Phi(t) = e^{At}$
  Solve the trajectory
  Continuous → Discrete
- Transformations
- Dynamic responses $\underline{X}_{zz}(t)$ $\underline{X}_{zs}(t)$
- Basic control - simple regulator, pole placement
  controllability, observability

5) Advanced Control State Space
- Observability and Controllability
- Proofs: Design equation for integral action
  Error dynamics for estimator

6) Advanced State Space / Compensator Theory
- Controllers + Estimators

- Seperation Principle
- Equivalent TF $C_{eq}(s)$