

EE 707: MULTIVARIABLE CONTROL THEORY (3-0-0 : 3)

Preamble

Multi-Input Multi-Output (MIMO) state space representations are used to model a wide array of dynamic processes spanning various domains ranging from cryptography to servo control. This course aims to study the mathematical theory behind these representations and discuss related computational methods. Further, this course will discuss various control strategies for the MIMO case.

Course Contents

Mathematical Fundamentals: Invariant subspaces, Similarity transformations, Quotienting and equivalence classes; Canonical Representations and Feedback Laws:, Multivariable Observer and controller canonical representations, multivariable pole placement problem, multivariable observer design problem; System decomposition: Controllability indices and system invariants, Controllability subspaces and Observability subspaces, stabilizability and detectability, Disturbance decoupling and Output stabilization problems; Binary Systems: Introduction to linear modular systems.

References

1. C. T. Chen, Linear System Theory and Design, Oxford.
 2. Oleg Gasparyan, Linear and Nonlinear Multivariable Feedback Control: A Classical Approach, John Wiley and Sons.
- W. Murray Wonham, Linear Multivariable Control: A Geometric Approach, Springer.