SC 201 - Mathematical Structures in Systems and Control

Instructors: S. Srikant (Room 203A, srikant@sc.iitb.ac.in)

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Course Topics:

Part I - Groups, Matrix Groups, Rigid Body Rotations,Rings, Fields, Vector Spaces (Linear Functionals and Duals, Annihilator, Direct Sum, Tensors, Adjoint and Similarity transformations, Multilinear forms and Determinant), Norms, Inner Product Spaces.

Part II - Continuity, Uniform Continuity, Set Point Topology (Countability, Limit Points, Compactness, Connected sets), Differentiability, Convexity, Linear and Nonlinear ODE's

Additionally we might cover some material on Geomteric Mechanics/Matrix Groups deriving from the notion of Groups above.

References:

Finite Dimensional Vector Spaces - P. Halmos, Springer, 1984

Principles of Mathematical Analysis - Walter Rudin, McGraw Hill (India) Third Edition, 2013

Lecture Notes on Elementary Topology and Geometry - I. M. Singer and J. A. Thorpe, Springer Undergraduate Texts in Mathematics, 1967

Evaluation Policy:

Quiz (4 Nos.) - 90%
Homework Assignments (graded only for completion) - 10%