

NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mathematics - NOC:Real Analysis - II

Subject Co-ordinator - Prof. Jaikrishnan J

Co-ordinating Institute - IIT - Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metric Spaces
Lecture 2 - Examples of metric spaces
Lecture 3 - Loads of definitions
Lecture 4 - Normed vector spaces
Lecture 5 - Examples of normed vector spaces
Lecture 6 - Basic properties open closed sets metric
Lecture 7 - Continuity in metric spaces
Lecture 8 - Equivalent metrics and product spaces
Lecture 9 - Completeness
Lecture 10 - Completeness (Continued...)
Lecture 11 - Completeness of $B(x,y)$
Lecture 12 - Completion
Lecture 13 - Compactness
Lecture 14 - The Bolzano-Weierstrass Property
Lecture 15 - Open covers and Compactness
Lecture 16 - The Heine-Borel Theorem for Metric Spaces
Lecture 17 - Connectedness
Lecture 18 - Path-Connectedness
Lecture 19 - Connected Components
Lecture 20 - The Arzela-Ascoli theorem
Lecture 21 - Upper and lower limits
Lecture 22 - The Stone-Weierstrass theorem
Lecture 23 - All norms are equivalent
Lecture 24 - Vector-valued functions
Lecture 25 - Scalar-valued functions of a vector variable
Lecture 26 - Directional derivatives and the gradient
Lecture 27 - Interpretation and properties of the gradient
Lecture 28 - Higher-order partial derivatives
Lecture 29 - The derivative as a linear map

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- Lecture 30 - Examples of differentiation
- Lecture 31 - Properties of the derivative map
- Lecture 32 - The mean-value theorem
- Lecture 33 - Differentiating under the integral sign
- Lecture 34 - Higher-order derivatives
- Lecture 35 - Symmetry of the second derivative
- Lecture 36 - Taylor's theorem
- Lecture 37 - Taylor's theorem with remainder
- Lecture 38 - The Banach fixed point theorem
- Lecture 39 - Newton's method
- Lecture 40 - The inverse function theorem
- Lecture 41 - Diffeomorphisms and local diffeomorphisms
- Lecture 42 - The implicit function theorem
- Lecture 43 - Tangent space to a hypersurface
- Lecture 44 - The definition of a manifold
- Lecture 45 - Examples and non examples of manifolds
- Lecture 46 - The tangent space to a manifold
- Lecture 47 - Maxima and minima in several variables
- Lecture 48 - The Hessian and extrema
- Lecture 49 - Completing the squares
- Lecture 50 - Constrained extrema and lagrange multipliers
- Lecture 51 - Curves
- Lecture 52 - Rectifiability and arc-length
- Lecture 53 - The Riemann integral revisited
- Lecture 54 - Monotone sequences of functions
- Lecture 55 - Upper functions and their integrals
- Lecture 56 - Riemann integrable functions as upper functions
- Lecture 57 - Lebesgue integrable functions
- Lecture 58 - Approximation of Lebesgue integrable functions
- Lecture 59 - Levi monotone convergence theorem for step functions
- Lecture 60 - Monotone convergence theorem for upper functions
- Lecture 61 - Monotone convergence theorem for Lebesgue integrable functions
- Lecture 62 - The Lebesgue dominated convergence theorem
- Lecture 63 - Applications of the convergence theorems
- Lecture 64 - The problem of measure
- Lecture 65 - The Lebesgue integral on unbounded intervals
- Lecture 66 - Measurable functions
- Lecture 67 - Solution to the problem of measure
- Lecture 68 - The Lebesgue integral on arbitrary subsets

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- Lecture 69 - Square integrable functions
- Lecture 70 - Norms and inner-products on complex vector spaces
- Lecture 71 - Convergence in L^2
- Lecture 72 - The Riesz-Fischer theorem
- Lecture 73 - Multiple Riemann integration
- Lecture 74 - Multiple Lebesgue integration