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

Subject Co-ordinator - Prof. Jaikrishnan J

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Achilles and the tortoise
Lecture 31 - Deep dive into the definition of convergence
Lecture 32 - A descriptive language for convergence
Lecture 33 - Limit laws
Lecture 34 - Subsequences
Lecture 35 - Examples of convergent and divergent sequences
Lecture 36 - Some special sequences-CORRECT
Lecture 37 - Monotone sequences
Lecture 38 - Bolzano-Weierstrass theorem
Lecture 39 - The Cauchy Criterion
Lecture 40 - MCT implies completeness
Lecture 41 - Definition and examples of infinite series
Lecture 42 - Cauchy tests-Corrected
Lecture 43 - Tests for convergence
Lecture 44 - Erdos_s proof on divergence of reciprocals of primes
Lecture 45 - Resolving Zeno_s paradox
Lecture 46 - Absolute and conditional convergence
Lecture 47 - Absolute convergence continued
Lecture 48 - The number e
Lecture 49 - Grouping terms of an infinite series
Lecture 50 - The Cauchy product
Lecture 51 - WEEK 5 - INTRODUCTION
Lecture 52 - The role of topology in real analysis
Lecture 53 - Open and closed sets
Lecture 54 - Basic properties of adherent and limit points
Lecture 55 - Basic properties of open and closed sets
Lecture 56 - Definition of continuity
Lecture 57 - Deep dive into epsilon-delta
Lecture 58 - Negating continuity
Lecture 59 - The functions x and x2
Lecture 60 - Limit laws
Lecture 61 - Limit of sin x_x
Lecture 62 - Relationship between limits and continuity
Lecture 63 - Global continuity and open sets
Lecture 64 - Continuity of square root
Lecture 65 - Operations on continuous functions
Lecture 66 - Language for limits
Lecture 67 - Infinite limits
Lecture 68 - One sided limits

Lecture 69 - Limits of polynomials
Lecture 70 - Compactness
Lecture 71 - The Heine-Borel theorem
Lecture 72 - Open covers and compactness
Lecture 73 - Equivalent notions of compactness
Lecture 74 - The extreme value theorem
Lecture 75 - Uniform continuity
Lecture 76 - Connectedness
Lecture 77 - Intermediate Value Theorem
Lecture 78 - Darboux continuity and monotone functions
Lecture 79 - Perfect sets and the Cantor set
Lecture 80 - The structure of open sets
Lecture 81 - The Baire Category theorem
Lecture 82 - Discontinuities
Lecture 83 - Classification of discontinuities and monotone functions
Lecture 84 - Structure of set of discontinuities
Lecture 85 - WEEK 8 and 9 - INTRODUCTION
Lecture 86 - Definition and interpretation of the derivative
Lecture 87 - Basic properties of the derivative
Lecture 88 - Examples of differentiation
Lecture 89 - Darboux_s theorem
Lecture 90 - The mean value theorem
Lecture 91 - Applications of the mean value theorem
Lecture 92 - Taylor's theorem NEW
Lecture 93 - The ratio mean value theorem and L_Hospital_s rule
Lecture 94 - Axiomatic characterisation of area and the Riemann integral
Lecture 95 - Proof of axiomatic characterization
Lecture 96 - The definition of the Riemann integral
Lecture 97 - Criteria for Riemann integrability
Lecture 98 - Linearity of integral
Lecture 99 - Sets of measure zero
Lecture 100 - The Riemann-Lebesgue theorem
Lecture 101 - Consequences of the Riemann-Lebesgue theorem
Lecture 102 - WEEK 10 and 11 - INTRODUCTION
Lecture 103 - The fundamental theorem of calculus
Lecture 104 - Taylor's theorem-Integral form of remainder
Lecture 105 - Notation for Taylor polynomials
Lecture 106 - Smooth functions and Taylor series
Lecture 107 - Power series

Lecture 108 - Definition of uniform convergence
Lecture 109 - The exponential function
Lecture 110 - The inverse function theorem
Lecture 111 - The Logarithm
Lecture 112 - Trigonometric functions
Lecture 113 - The number Pi
Lecture 114 - The graphs of sin and cos
Lecture 115 - The Basel problem
Lecture 116 - Improper integrals
Lecture 117 - The Integral test
Lecture 118 - Weierstrass approximation theorem
Lecture 119 - Bernstein Polynomials
Lecture 120 - Properties of Bernstein polynomials
Lecture 121 - Proof of Weierstrass approximation theorem