

03.12.2020

Programme Report

Name of the Programme: Workshop on Real Analysis

Date: 3rd December 2020

The department organized an online workshop on Real Analysis through google meet on 3rd December 2020 at 5 pm. The workshop provided participants with an in-depth exploration of the fundamental concepts of sequences and series of real numbers. The session addressed previous years' JAM Mathematics questions in the area sequences of real numbers. Dr. Shijina. V (Assistant Professor, Department of Mathematics, Co-operative Arts & Science College, Madayi) managed the session and discussed some related problems. The session aimed to strengthen participants' problem-solving skills, foster collaboration, and explore various problem-solving techniques in the context. Final Year BSc Mathematics Students of the department actively attended the session.

DEPARTMENT OF MATHEMATICS

CO-OPERATIVE ARTS AND SCIENCE COLLEGE, MADAYI

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DEPARTMENT OF MATHEMATICS

Co-operative Arts and Science College, Madayi

Payangadi RS. (PO) , Kannur, Kerala-670358

WORKSHOP ON REAL ANALYSIS

Resource Person:

Dr. Shijina.V

Assistant Professor & HOD
Department of Mathematics
CAS College, Madayi

on
3rd December 2020, 5 pm

via; Google Meet



Faculty Co-ordinators:

Dr.Shijina.V

(Assistant Professor & HOD)

Smt. Sruthi Chundakkaran

(Assistant Professor)

3.5.5 Cauchy Convergence Criterion A sequence of real numbers is convergent if and only if it is a Cauchy sequence.

(1) Let $y = (y_n)$ be a sequence of real numbers given by

$$y_1 = \frac{1}{1!} \quad y_2 = \frac{1}{1!} - \frac{1}{2!}$$

$$y_n = \frac{1}{1!} - \frac{1}{2!} + \dots + \frac{(-1)^{n+1}}{n!}$$

s.t. y is cgd.

Solution

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(3) Let $x = (x_n)$ be defined by

$$x_1 = 1 \quad x_2 = 2 \quad x_n = \frac{1}{2}(x_{n-2} + x_{n-1})$$

for $n > 2$

Find $\lim(x)$.

Solution

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$$\begin{aligned}\lim(x_{2n+1}) &= \lim \left(1 + \frac{2}{3} \left(1 - \frac{1}{4^n} \right) \right) \\ &= 1 + \frac{2}{3} \left(1 - \lim \left(\frac{1}{4^n} \right) \right) \\ &= 1 + \frac{2}{3} (1 - 0) \\ &= \frac{5}{3}\end{aligned}$$

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Let $x = \lim(x_n)$

consider the subsequence (x_{2n+1}) of (x_n) .

We have,

$$x_{2n+1} = 1 + \frac{1}{2} + \frac{1}{2^3} + \dots + \frac{1}{2^{2n-1}}$$

$x = \lim(x_n) = \frac{1}{2} (\lim(x_{2n}) + \lim(x_{2n+1}))$

$$x = \frac{1}{2} (x + x)$$
$$x = x$$

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