REPRINTED FROM THE

PROCEEDINGS

OF THE

SIXTY-SECOND SESSION OF THE

INDIAN SCIENCE CONGRESS

Delhi 1975.

ABSTRACTS

(Section of Mathematics)

President: Dr. S. R. Sinha, M. A., D. Phil.

SUMMABILITY

1. <u>On the Absolute and Uniform Convergence of a Fourier-Bessel Series.</u>

S. R. Agrawal, Baroda.

Let

$$c_\nu(\alpha,\beta) = J_\nu(\alpha)\, Y_\nu(\beta) - J_\nu(\beta)\, Y_\nu(\alpha),$$

where $J_\nu(t)$ and $Y_\nu(t)$ are respectively the Bessel's functions of the first and the second kinds of order $\nu \geq -1/2$.

Define

$$C_m^{(\nu)}(t) = \sqrt{t}\, c_\nu(t\gamma_m, b\gamma_m), \quad 0 < a \leq t \leq b,$$

where γ_m is the m-th positive root of $c_\nu(az, bz)$. For $f \in L[a,b]$, the series

$$f(x) \sim \sum_{m=1}^{\infty} d_m\, C_m^{(\nu)}(x), \tag{1}$$

where

$$d_m = \frac{\pi^2}{2} \cdot \frac{\gamma_m^2\, J_\nu^2(a\gamma_m)}{J_\nu^2(a\gamma_m) - J_\nu^2(b\gamma_m)} \int_a^b f(t)\, C_m^{(\nu)}(t)\, dt,$$

is called the Fourier-Bessel series of the third type.

$f \in \Lambda_\alpha[a,b]$, $0 < \alpha < 1$, if f is continuous and

$$\sup.\left\{|f(t) - f(x)| : |t-x| \leq \delta,\ t, x \in [a,b]\right\} = O(\delta^\alpha).$$

The following theorem is proved:

<u>If</u> $f \in L^2[a,b]$ <u>and</u> $f \in \Lambda_\alpha[a,b]$, $\nu > 0$, <u>then the series</u> (1) <u>converges uniformly and absolutely when</u> $1/2 < \alpha \leq 1$.

...

UNIVERSITY OF VICTORIA
P.O.Box 1700, Victoria, British Columbia, Canada V8W 2Y2

Department of Mathematics,
April 4, 1975.

Dr. C.M.Patel,
Department of Mathematics,
Faculty of Science,
M.S.University,
Baroda-390002, India.

Dear Dr. Patel,

I am pleased to accept the revised version of your joint paper, " On the convergence and Riesz-summability of a Fourier-Bessel series" (with S.R.Agrawal), for publication in Jñānabha (Section A). Your typescript is being forwarded to the Cnai office of the Vijnana Parishad; hopefully, it will be included in Vol. 5, 1975.

Sincerely,

sd/-

H.M.Srivastava,
Professor of Mathematics.

INDIAN NATIONAL SCIENCE ACADEMY

Bahadur Shah Zafar Marg,

New Delhi-1.

Ref. No. EP/1135JM/857 Dated 7-6-1975.

Paper entitled: "On the order of the coefficients and convergence of a Fourier-Bessel series of a differentiable function" by C. M. Patel and yourself.

Dear Dr. Agrawal,

I am glad to inform you that the above paper has been accepted for publication in Indian Journal of Pure and Applied Mathematics/Proceedings of INSA, Part A/ Proceedings of INSA, Part B.

sd/- Illegible

For Editor of Publications

TRUE COPY

Aligarh

Dated 11 . 10 . 75.

Author(s): 'On the convergence of Fourier-Bessel Series'.

Manuscript received with thanks.

Referee's Report due.

Referee's Report received with thanks.

Accepted for publication.

Remarks:

Please inform your co-author about it.

sd/- M. Mohsin

Editor

The Aligarh Bulletin of Mathematics,

Department of Mathematics & Statistics,

Aligarh Muslim University, ALIGARH.

TRUE COPY