APPENDIX

-emma 3.3. For $\frac{1}{n} < t \le \delta < \pi$ $\qquad M_n(t) = o\left(\frac{A_{n,\tau}}{t}\right)$

Proof : Since $\frac{1}{n} < t \le \delta < \pi$ $\qquad \sin\frac{t}{2} < t$

Therefore,

$$M_n(t) = \left| \frac{1}{2\pi} \sum_{k=0}^{n} a_{n,n-k} \frac{\sin\left(n-k+\frac{1}{2}\right)t}{\sin\left(\frac{t}{2}\right)} \right|$$

$$= o\left(\frac{1}{t} \text{ Imaginary part of } \left| \sum_{k=0}^{n} a_{n,n-k}\, e^{i\left(n-k+\frac{1}{2}\right)t} \right| \right)$$

$$= o\left(\frac{1}{t} \left| \sum_{k=0}^{n} a_{n,n-k}\, e^{i(n-k)t} \right| \left| e^{i\frac{t}{2}} \right| \right)$$

$$= o\left(\frac{1}{t} \left| \sum_{k=0}^{n} a_{n,n-k}\, e^{i(n-k)t} \right| \right)$$

$$= o\left(\frac{A_{n,\tau}}{t}\right) \text{by lemma (3.2)}$$

which proves the lemma.

4. PROOF OF THE THEOREM : Following Titchmarsh (1939, P. 403).

$$S_k(x) - f(x) = \frac{1}{2\pi} \int \phi(t) \frac{\sin\left(k+\frac{1}{2}\right)t}{\sin\left(\frac{t}{2}\right)} dt + o(1) \text{ uniformly in } E.$$

Then,

$$t_n(x) = \sum_{k=0}^{n} a_{n,n-k} \left\{ S_{n-k}^{(x)} - f(x) \right\}$$

$$= \frac{1}{2\pi} \int_0^{\delta} \left(\sum_{k=0}^{n} a_{n,n-k} \frac{\sin\left(n-k+\frac{1}{2}\right)t}{\sin\left(\frac{t}{2}\right)} \right) \phi(t)\, dt + o(1)$$

$$= \int_0^{\delta} M_n(t)\, \phi(t)\, dt + o(1) \text{ uniformly in } E$$

$$= \left(\int_0^{1/n} + \int_{1/n}^{\delta} \right) M_n(t)\, \phi(t) + o(1) \text{ uniformly in } E$$

$$= I_1 + I_2 + o(1) \text{ uniformly in } E \quad (4.1)$$

Now,

$$I_1 = \int_0^{\frac{1}{n}} \phi(t)\, M_n(t)\, dt \text{ uniformly in } E$$

$$|I_1| \le \int_0^{\frac{1}{n}} |\phi(t)|\, |M_n(t)|\, dt \text{ uniformly in } E$$

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ON UNIFORM MATRIX SUMMABILITY OF A FOURIER SERIES

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ɪ this paper the concept of uniform matrix summability has been introduced. Saxena (1965) ɪd Rajagopal (1963) established same interesting results on uniform harmonic and Nörlund ɪmmability of Fourier Series. In this paper a more general result than those of Saxena and ɪjagopal has been obtained so that their results come out as particular cases.

. **DEFINITIONS AND NOTATIONS** : Let $T = (a_{n,k})$ be an infinite triangular matrix ɪtisfying the Silverman Toepliz (1913) condition of regularity.

e.,
$$\sum_{k=0}^{n} a_{n,k} \to 1 \text{ as } n \to \infty,$$

$$a_{n,k} = 0 \text{ for } k > n$$

ɪd $|a_{n,k}| \leq M$, a finite constant.

.et $f \in L(-\pi, \pi)$ and be periodic with period 2π and let

$$\frac{1}{2} a_0 + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx) \qquad \dots (1.1)$$

e considered Fourier series of the function f.

.et $\sum_{m=0}^{\infty} u_m(x)$ be an infinite series such that

$$S_m(x) = u_0(x) + u_1(x) + \dots + u_k(x) + \sum_{v=0}^{k} u_v \qquad \dots (1.2)$$

' there exists a function $S = S(x)$ such that

$$t_n(x) = \sum_{k=0}^{n} a_{n,k} \{S_k(x) - S\}$$

$$= \sum_{k=0}^{n} a_{n,n-k} \{S_{n-k}(x) - S\}$$

$$t_n(x) = 0(1) \text{ as } n \to \infty$$

ɪiformly in a set E in which $S = S(x)$ is bounded then we say that the series $\sum_{m=0}^{\infty} u_m(x)$ is ɪmmable (T) uniformly in Set E to the sum S.

'e shall use following notations :

$$\phi(t) = f(x+t) - f(x-t) - 2f(x)$$

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