

# Indian Journal of Mathematics

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**Charles W. Neville**

FRAMES AND GENERALIZED GLEASON ALGEBRAS

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**Abstract:** We define and study the generalized Gleason algebra of a pre-bi-frame, as a generalization of the generalized Gleason algebra of a bi-comparable bi-topological space. We prove a Stone representation theorem for an important class of pre-bi-frames (sup preserving Boolean extensions of frames), and use this to generalize and reprove a Loomis Sikorski representation theorem for frames in the context of generalized Gleason algebras of pre- bi-frames. Finally, we characterize the representing function in terms of adjunction and minimal properties.

**J. L. Lavoie, F. Grondin and A. K. Rathie**

GENERALIZATIONS OF WATSON'S THEOREM ON THE SUM OF  $A_3F_2$

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**Abstract:** Twenty five formulas, closely related to Watson's theorem in the story of the generalized hypergeometric series, are obtained. Numerous special cases are also given.

**G. D. Dixit And C. S. Rees**

A UNIFIED STUDY OF ABSOLUTE RIESZ SUMMABILITY OF FOURIER SERIES 33-43

**Abstract:** In this paper we present a theorem that fills some lacunae in existing results in the study of absolute summability of Fourier series by Riesz means. The theorem given here links some apparently unrelated results involving different Riesz methods such as those with 'type':

$$\exp(w/(\log w)^p), \exp(w^q), \exp(w/(\log w)^r),$$

etc. The versatility of the theorem is shown in corollaries. Some of these are new, while some others provide extensions of known results in different directions. Results given here for Riesz summability are similar to those studied by Das and Mohapatra [5] for general Nörlund means.

**P. N. Natarajan**

CHARACTERIZATION OF SOME SPECIAL CLASSES OF INFINITE MATRICES  
OVER NON-ARCHIMEDEAN FIELDS

45-51

**Abstract:** For matrices  $A = (a_{nk}), a_{nk} \in K, n, k = 1, 2, \dots$ , where  $K$  is a complete, non-trivially valued, non-archimedean field, it is shown that  $A$  transforms any bounded, non-null sequence  $x$  with non-zero entries, all subsequences obtained from which and interpolated with zeros thereafter in any manner (forming the class  $Z(x)$  of sequences) are transformed by  $A$  into null sequences. A Steinhaus type result then leads us to a characterization of a null sequence  $x$  among bounded sequences

with non-zero entries through the existence of a special matrix which transforms all sequences in  $Z(x)$  into null sequences.

**S. Elumalai and R. Ravi**

APPROXIMATION IN LINEAR 2-NORMED SPACES

53-59

**Abstract:** We give some characterizations of elements of best approximation (best coapproximation) in linear 2-normed spaces in terms of bounded linear 2-functionals.

**P. K. Jain, A. M. Jarrah and D. P. Sinha**

ALMOST SHRINKING, SEMI SHRINKING AND SEMI BOUNDEDLY COMPLETE  
SCHAUDER BASES IN LOCALLY CONVEX SPACES

61-72

**Abstract:** Some results giving the existence or non existence of almost shrinking, semi shrinking and semi boundedly complete Schauder bases in locally convex spaces have been obtained. In some cases it has been shown that an almost shrinking Schauder basis is never semi shrinking. The converse, however, seems to remain open. Certain conditions have been obtained under which there are relations of duality between semi shrinking and boundedly complete Schauder bases and in barrelled space, between semi boundedly complete and shrinking Schauder bases.

**S. D. Sharma and R. K. Singh**

COMPACT COMPOSITION OPERATORS ON  $H^2(D^n)$

73-79

**Abstract:** Let  $D^n$  denote the Cartesian product of  $n$  copies of the unit disc  $D$  of the complex plane and let  $\phi$  be a holomorphic function from  $D^n$  into itself such that  $f \circ \phi \in H^2(D^n)$  whenever  $f \in H^2(D^n)$ . Then the mapping  $C_\phi$  defined as  $C_\phi f = f \circ \phi$  is a bounded linear operator on  $H^2(D^n)$  and it is called composition operator induced by  $\phi$ . In this note we characterize compact and Hilbert-Schmidt composition operators on  $H^2(D^n)$ .

**Bassam Al-Nashef**

WEAKLY DISSECTABLE COVERS

81-89

**Abstract:** We define an open cover  $\mathcal{U}$  to be weakly dissectable if it has a  $\sigma$ -closure preserving closed  $N$ -refinement. We characterize regular  $\sigma$ -spaces by having weakly dissectable bases. Finally we define a new class of spaces, called weakly  $D$ -paracompact spaces and study some of its properties, we prove that every metacompact weakly  $D$ -paracompact space is  $D$ -paracompact.

**Giuseppe Marino and Giulio Trombetta**

ON APPROXIMATING FIXED POINTS FOR NONEXPENSIVE MAPS

91-98

**Abstract:** Let  $K$  be a closed convex subset of a Hilbert space  $H$  and let  $f : K \rightarrow H$  be a nonexpensive map,  $z$  a point in  $K$ ,  $f_t(x) := t f(x) + (1-t)z$ , ( $t \in (0, 1)$ ) and  $P : H \rightarrow K$  the metric projection. We study the behaviour of the fixed points  $x_t$  and  $y_t$  of the maps  $(Pf)_t$  and  $Pf_t$  respectively and we show that if  $f$  has fixed points, then  $\lim_{t \rightarrow 1^-} x_t = \lim_{t \rightarrow 1^-} y_t$ , where  $y$  is the fixed point of  $f$  that is closest to  $z$ .

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