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G. S. Srivastava and Mushtaq Shaker

ON THE APPROXIMATION OF ANALYTIC FUNCTIONS OF TWO  
COMPLEX VARIABLES BY EXPONENTIAL POLYNOMIALS 1-13

**Abstract:** Let  $f(s_1, s_2) = \sum_{m,n=0}^{\infty} a_{mn} \exp(s_1 \lambda_m + s_2 \mu_n)$ ,  $s_w = \sigma_w + it_w$ ,  $w = 1, 2$  be analytic in the hyperplane  $\operatorname{Re} s_1 < \alpha_1 < \infty$ ,  $\operatorname{Re} s_2 < \alpha_2 < \infty$ ,  $(-\infty < \alpha_1, \alpha_2 < \infty)$ , and  $\Pi_{mn}$  be the class of all exponential polynomials of degree  $mn$  at most. In this paper, the growth parameters of  $f$  have been characterized in terms of the error in approximating  $f$  by exponential polynomials.

Ruyun Ma

MULTIPLICITY RESULTS FOR AN  $m$ -POINT BOUNDARY VALUE  
PROBLEM AT RESONANCE 15-31

**Abstract:** This paper deals with second order  $m$ -point value problem

$$\begin{aligned} u''(t) &= f(t, u(t)), \quad t \in (0, 1) \\ u'(0) &= 0, \quad u(1) = \sum_{i=1}^{m-1} a_i u(\xi_i), \end{aligned}$$

where  $f : [0, 1] \times \mathbf{R} \rightarrow \mathbf{R}$  is continuous,  $a_i$  and  $\xi_i \in [0, \infty)$  are given constants such that  $\sum_{i=1}^{m-1} a_i = 1$ , and  $0 = \xi_1 < \xi_2 < \dots < \xi_{m-1} < \xi_m = 1$ . We develop the methods of lower and upper solutions by the existence of connected sets of solutions to parameterized families of equations. As applications of these methods,

we get several multiplicity results for the problems under consideration.

**Pon. Sundar and John R. Graef**

POSITIVE SOLUTIONS OF AN ODD ORDER NEUTRAL NONLINEAR  
DELAY DIFFERENCE EQUATION

33-50

**Abstract:** In the present paper we consider the nonlinear neutral difference equation

$$\Delta^m[y(n) - p(n)y(n-k)] + q(n) \prod_{i=1}^l |y(n - \sigma_i)|^{\alpha_i} \operatorname{sgn} y(n - \sigma_i) = 0, \quad (e)$$

where  $m \geq 1$  is odd,  $K > 0$  and  $\sigma_1 \geq 0$  are integers,  $p(n) \geq 0$ ,  $q(n) \geq 0$ ,  $\alpha_i > 0$ , for  $i = 1, 2, \dots, l$  and  $\sum_{i=1}^l \alpha_i = 1$ . A comparison theorem is proved and as a consequence, some new oscillation criteria for (e) are derived.

**S. L Singh, Ashish Kumar and Amal M. Hashim**

FIXED POINTS OF CONTRACTIVE MAPS

51-58

**Abstract:** In metric fixed-point theory, fixed-point theorems for contractive maps require the continuity of maps and compactness of the space. The purpose of this paper is to obtain fixed-point theorems for maps satisfying contractive type maps on (not necessarily complete) metric spaces, wherein, besides other relaxations, the continuity of maps is replaced by reciprocal continuity. A pair of reciprocally continuous maps may be discontinuous on a metric space. The remarkable aspect of such fixed-point theorems is that the maps may be discontinuous at their common fixed point.

**Daniela Calvo**

CAUCHY PROBLEM IN INHOMOGENEOUS GEVREY CLASSES FOR  
OPERATORS WITH CONSTANT COEFFICIENTS

59-76

**Abstract:** We study the Cauchy problem in the spaces of inhomogeneous Gevrey functions, that extend the standard Gevrey classes by means of the Fourier transform and are based on a given weight function. The well posedness is proved for a class of weakly hyperbolic operators with constant coefficients, characterized by some weighted Levi-type conditions on the lower order terms.

**Manish Kumar and Mamta Rani**

AN EXPERIMENT WITH SUMMABILITY METHODS IN THE DYNAMICS  
OF THE LOGISTIC MODEL

77-89

**Abstract:** The main purpose of this paper is to introduce Nörlund summability methods in the dynamics of the logistic function. The experimental analysis shows some striking features in this new kind of dynamics.

**K. D. Magill, Jr.**

CHARACTERIZATIONS OF SOME RINGS WITHIN THE CLASS OF  
NONASSOCIATIVE EUCLIDEAN NEARRINGS

91-97

**Abstract:** In this paper, we determine, up to isomorphism, all those nonassociative Euclidean nearrings  $\mathcal{N}^n$  with additive group  $\mathbf{R}^n$ , the  $n$ -dimensional Euclidean group where  $\mathcal{N}^n$  contains  $n$  linearly independent elements, some of which are left identities, and the remainder of which are left annihilators. We show that, in fact, these are all associative rings. We go on to determine the ideals

and quotient rings of these rings and we investigate the multiplicative semigroups of these rings.

**Nayandeep Deka Baruah and Jonali Bora**

NEW PROOFS OF RAMANUJAN'S MODULAR EQUATIONS OF  
DEGREE 9

99-122

**Abstract:** In this paper, we find new proofs of some of Ramanujan's modular equations of composite degree 9 by using his theta-function identities.

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