GEOMETRIC INEQUALITIES OF CHEEGER TYPE FOR THE FIRST POSITIVE EIGENVALUE OF THE n–DIMENSIONAL FREE MEMBRANE PROBLEM
Alberta Avinyo, Xavier Mora

New lower bounds are derived for the first positive eigenvalue of the n–dimensional free membrane problem. the lower bounds obtained are related to those of Cheeger (1970), and they turn out to be sharper in the special case of convex plane domain.

A STRONG BOOLEAN HYPERALGEBRA OF BOOLEAN FUNCTIONS
Maria K. Konstantinidou and Aspasia I. Synefaki

In this paper, a strong Boolean hyperalgebra is constructed, which has carrier the set of Boolean functions over such a hyperalgebra.

MATHEMATICAL MODELLING OF SOME ELECTRIC CIRCUITS AS NETWORKS UNDER FORCE
Nicolae Boja

The general concept of network "under force" introduced in our paper [1] for the electric circuits with structural elementss resistors and capacitors is applied. Two types of stiffness matrices are associated and a method to obtain the corresponding aggregate stiffness matrices for the whole network is given.

BURGERS PROBLEMS. Theoretical results.
M. Morandi Cecchi, R. Nociforo, P. Patuzzo Grego

Theory and weak formulation of quasi–linear parabolic problems on Sobolev space–time domains governed by Burgers equation: a priori estimates, existence, uniqueness and maximum principle theorems are presented for weak initial conditions.

A GRAPH THEORETIC ALGORITHM FOR COMPUTING THE (CO)HOMOLOGY OF POLYHEDRA
A. Cavicchioli, M. Meschiari and F. Spaggiari

Si elabora un semplice algoritmo per il calcolo automatico, mediante computer, dei gruppi di (co)omologia di un poliedro compatto (ed in particolare di una varietà triangolabile) a partire da una sua rappresentazione mediante grafi colorati sugli spigoli. Numerosi esempi illustrano, in casi particolari, la validità di questo algoritmo. Infine, si allega un catalogo parziale dei caratteri (co)omologici di una famiglia di trivarietà chiuse, dipendenti da tre interi positivi e da una permutazione.

A KOLMOGOROV–LIKE EXTENSION THEOREM FOR DISTRIBUTIONS WITH COMPACT SUPPORTS
Franco Chersi and Silvia Guarrera

The Daniell–Kolmogorov theorem concerning projective limits of probability measures can be generalized to systems of signed Radon measures. In this paper we prove a similar theorem, concerning inductive systems of (Schwartz) distributions with compact supports. This result might be a first tool for the construction of stochastic processes, in which the finite–dimensional data are distributions rather than measures.

OSCILLATIONS AND ASYMPTOTIC STABILITY OF SOLUTIONS OF A SYSTEM OF TWO FIRST ORDER NEPCA

Nicholas Karydas

We study the asymptotic stability and the oscillatory behavior of the solutions of a class of systems of two first order neutral differential equations with piecewise constant argument.

SKOROHOD INTEGRAL FOR A PARTICULAR CLASS OF NONADAPTED PROCESSES

Maria Elvira Mancino, Luca Pratelli

We give necessary and sufficient conditions for the Skorohod integrability of a particular class of integrand processes $H = k \otimes f(W(h_1), ..., W(h_n))$ which involve only the property that f belongs to an appropriate function space.

THE SUBHYPERGROUPS OF THE FORTIFIED JOIN HYPERGROUP

Gerasimos G. Massouros

The Fortified Join Hypergroup, which is a hypercompositional structure directly connected with computer theory, has certain special properties that give birth to several types of subhypergroups. In this paper those subhypergroups are being introduced along with a study of their properties and an analysis of the relations that are being developed between them.

MODELIZATION IN NON STATIONARY FINITE MARKOV CHAIN

M. Molina, M. González–Velasco

In this paper, situations in which individuals move through a finite set of states according to a nonstationary Markov chain with dependence on covariates are considered. Making use of the Multiple–group logistic Regression Model, the transition probabilities are modeled. The maximum likelihood estimation of the parameters is considered and a diagnostic method to evaluate whether the logistic model is the correct one to fit is studied.

AN ALGORITHM ON NUMBER OF ISOMORPHISM CLASSES OF HYPERGROUPS OF ORDER 3

Giorgio Nordo

An algorithm which computes the number S_3 of isomorphisms classes of hypergroups of order 3 and the cardinality of each class of isomorphisms is given.

INTÉGRATION EN ANALYSE INFINITÉSIMALE

Yvette Feneyrol–Perrin

Dans cet article nous donnons les fondements d'une théorie de l'intégration à la Lebesgue dans un esprit infinitésimal.

L'idée de base de l'analyse infinitésimale est que l'espace est composé non de points (sans dimension et sans masse) mais de petites cellules, en nombre fini illimité. Une fonction est constante sur chaque cellule. Il s'agit de définir la classe des fonctions num
'eriques intégrables sur un ensemble au moyen d'une décomposition finie de cellules infinitésimales,

cette classe ne dépendant pas de la décomposition choisie. De façon plus précise, étant donné un ensemble hyperfini E, muni d'une distance d et d'une mesure strictement positive m, nous appelons approximation de cet espace toute partition $\mathcal{P}$ de E dont les atomes (ou éléments) sont des parties de E de diamètre infinitésimal. A toute fonction numérique définie sur E nous associons la fonction g constante sur chaque atome de $\mathcal{P}$ et définie de la façon suivante:

$$\forall A \in \mathcal{P},\ g(A) = \frac{1}{m(A)} \int_A f\, dm,$$

que nous appelons moyennée de f ou approximation de f relative à $\mathcal{P}$.

Notre but est de donner une définition de l'intégrabilité des fonctions numériques définies sur E qui soit stable par changement d'approximation. C'est–dire si f est intégrable sur E alors pour toute approximation $\mathcal{P}$ de E, la moyennée de f sur $\mathcal{P}$ est intégrable et infiniment proche de f pour la norme L^1.

LATERAL SYSTEM OF A FISH, EDGE WAVES AND SOLVABLE MODEL BASED ON THE OPERATOR EXTENSIONS THEORY

I. Yu. Popov and S.L. Popova

The possibility of detection of sound wave by means of the lateral line organ of a fish is shown. The existence of edge waves is shown and the resonance mechanism of the process is described. The consideration is based on the theory of self–adjoint operator extensions. The method of computing the parameters of the acoustic system of the lateral line is suggested. The mathematical results is used for the description of edge waves for periodic coastline.

CONTINUITY FOR THE STRAIN VELOCITY TENSOR IN TWO–DIMENSIONAL VARIATIONAL PROBLEMS FROM THE THEORY OF THE BINGHAM FLUID

Gregory Seregin

We consider the variational functional $I(u;\Omega \subset \mathbb{R}^2) = \int_\Omega (\mu|\varepsilon(u)|^2 + \sqrt{2}\ k_*|\varepsilon(u)| - f \cdot u)dx$ for solenoidal velocity fields $u \in W^{1,2}(\Omega;\mathbb{R}^2)$. We show that if f belongs to the Morrey space $L^{2,2\lambda}(\Omega;\mathbb{R}^2)$ for some $\lambda > 0$, and $I(u;\Omega) \le I(v;\Omega)$ for any solenoidal vector–valued functions $v \in u + \overset{\circ}{W}{}^{1,2}(\Omega;\mathbb{R}^2)$, then the strain velocity tensor $\varepsilon(u)$ is continuous in Ω.

THE PROPERTIES OF HX GROUPS

Zhang Zhen Liang

In [1] the concept of hypergroup has been raised firstly (here it is called HX group for short), in [2] and [3] the concepts of normal HX group and uniform HX group have been described respectively. In this paper the structures and the properties of each HX groups will be considered systematically. Thus we can see clearly the evolutions from HX groups to quotient groups.