Session : Algebra And Homotpy

Branched covering and Riemann surfaces

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Résumé/Abstract

Riemann surfaces theory has a very important role in various mathematical fields, precisely in complex geometry. By using the branched covering we can construct examples that allows us to see a Riemann surface in several aspects: algebraic, analytic and topological.

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Uniform algebraic Trigonometric spline Quasi-interpolants and the integral equations

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Abstract

In this work, we present a new kind of quadratic splines quasi-interpolation operator constructed from both algebraic and trigonometric functions. With this operator we can approximate a function and its derivative from the values given on the nodes of the subdivision. We also present a class of quadrature rules with endpoint corrections based on integrating spline quasi-interpolants. Furthermore, an application of these quadrature rules to the numerical solution of Fredholm integral equations of the second kind is worked out in detail. Error estimates and numerical examples are given to show that this new operator could produce highly accurate results.

Keywords : Algebraic Trigonometric splines, Spline quasi-interpolant, Quadrature rule, Fredholm integral equation.

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Superstability of Kannappan's and Van vleck's functional equations.

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Résumé/Abstract

Résumé

In this paper we prove the superstability theorems of the functional equations

$$\mu(y)f(x\sigma(y)z_0) \pm f(xyz_0) = 2f(x)f(y),\ x, y \in S,$$

$$\mu(y)f(\sigma(y)xz_0) \pm f(xyz_0) = 2f(x)f(y),\ x, y \in S,$$

where S is a semigroup, σ is an involutive morphism of S, and $\mu : S \longrightarrow \mathbb{C}$ is a bounded multiplicative function such that $\mu(x\sigma(x) = 1$ for all $x \in S$, and z_0 is in the center of S.

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Spherical interpolatory geometric subdivision schemes

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Abstract
Subdivision is the process of generating curves and surfaces by iteratively refining a given initial polygon according to certain refinement rules. Subdivision schemes are said to be interpolatory if the limit curve interpolates the vertices of the initial control polygon. Interpolatory geometric schemes for curves in the plane are well studied ([1]). Such schemes take the geometry of the control polygons into account by using non-linear refinement rules and generate limit curves. These curves are in general G^1-continuous which means they are good 1-sub-manifolds on the plane. Subdivision schemes on manifolds ([2], [3]) are method to refining geodesic polygon to approach some embedded curves on the manifold . The analysis of these schemes is based on their proximity to the linear schemes which they are derived from. Such schemes can generate C^1-limit curves.
We define general geometric subdivision schemes generating curves on the 2-dimensional unit sphere by using geodesic polygons and spherical geometry. We show that a spherical interpolatory geometric subdivision scheme is convergent if the sequence of maximum edge lengths is summable and the limit curve is G^1-continuous if in addition the sequence of maximum angular defects is summable. Some experimental examples are given to demonstrate the excellent properties of these schemes.

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Groupe des isométries des métriques Lorentziennes invariantes à gauche sur les groupes de Lie

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Résumé/Abstract

Soit (G, g) un groupe de Lie non abélien simplement connexe unimodulaire de dimension 3 doté d'une métrique Lorentzienne invariante à gauche. On s'intéresse à trois questions étroitement liées.

Question1 : peut-on donner une formule explicite pour le groupe des automorphismes isométriques $Aut(G, g)$?

Question2 : le groupe d'isotropie de l'élément neutre $isom_e(G, g)$ est-il égal à $Aut(G, g)$?

Question3 : comment peut-on calculer $isom_e(G, g)$ si ce dernier contient strictement $Aut(G, g)$?

Par le choix d'une base B orthonormée relativement à g_e le groupe d'isotropie $isom_e(G, g)$ est identifié avec un sous-groupe du groupe orthogonal $O(2, 1)$. On donne ici en utilisant la classification des métriques à automorphisme près [9], une détermination explicite du groupe complet des isométries en fonction de la métrique g.

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Note on a relative Hilali conjecture I

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Abstract

The well-known Hilali conjecture stated is one claiming that if X is a simply connected elliptic space, then dim $\Pi_*(X) \otimes \mathbb{Q} \leq$ dim $H_*(X, \mathbb{Q})$. In this paper we propose that if $f : X \to Y$ is a continuous map of elliptic spaces, then dim Ker $\Pi_*(f)_{\mathbb{Q}} \leq$ dim Ker $H_*(f; \mathbb{Q}) + 1$, and we prove this for certain reasonable cases. Our proposal is a relative version of the Hilali conjecture and it includes the Hilali conjecture as a special case.

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Approximation of common fixed point of monotone semigroups in modular spaces

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Résumé/Abstract

A family $F = \{T_t : t \geq 0\}$ is called a semigroup on a subset C of a modular space X_ρ if $T_0(x) = x$ and $T_{s+t} = T_s \circ T_t$, for all s, t positive, for all $x \in C$.
The theory of semigroups is very interesting in mathematics and applications. As a situation, in the theory of dynamical systems, the space X on which the semigroup $\mathscr{S}$ is defined will represent the states space and the mapping

$$\begin{aligned} \mathbb{R}_+ \times C &\longrightarrow C \\ (t, s) &\longmapsto T_t(x) \end{aligned}$$

would represent the evolution function of the dynamical system.
The problem of the existence of common fixed points for semigroups still in its beginning. In [1], Bachar et al. gave some existence results of common fixed points for semigroups of monotone contractions and monotone nonexpansive mappings in Banach spaces. For semigroups acting in modular function spaces, Kozlowski [3] have proved that the set of common fixed points of any ρ-nonexpansive semigroups, on a ρ-closed convex and ρ-bounded subset of a uniformly convex modular function modular L_ρ, is nonempty and ρ-closed and convex.
Once the existence of a fixed point of some mapping is established, then to find a value of that fixed point is not an easy task. That is why we use iteration processes for computing them. By time, many iteration processes have been extensively studied by many authors. For example, Halpern [2] has introduced the following explicit iteration scheme, for an element $u \in H$ and $x_0 \in H$

$$x_{n+1} = \alpha_n u + (1 - \alpha_n)T(x_n), \text{ for all } n \geq 0, \tag{1}$$

where $(\alpha_n)_n$ is a sequence in $(0, 1)$ and H is a Hilbert space. Subsequently, many mathematical workers paid their attention to study the convergence of Halpern ?s iteration for semigroups of various nonlinear, such as Xu [4].
Motivated by the cited results, The aim of this paper is to prove the existence and approximation of a common fixed point of monotone ρ-nonexpansive semigroups in modular space.

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Fixed point theorem for topological set endowed with a graph, and application to modular and function modular spaces

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Résumé/Abstract

The aim of his work is to generalize the results obtained in [?] in the restricted case of posets, to the wider context of a topological set endowed with a graph.

We then explore some interesting applications of the obtained results in modular spaces, and modular function space, when the modular ρ has the Δ_2-type property.

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A New Iteration Scheme For Approximating Fixed Points

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Abstract

In this paper, we introduce a new iterative scheme to approximate fixed point of contractive and nonexpansive mappings and we show that the most used fixed point iterative methods are convergent to the fixed point. Our results extend several relevant convergence theorems of the iterative schemes.
To support our claim, we give an illustrative numerical comparison of these methods with respect to their convergence rate.

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The relative Hilali conjecture

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Résumé/Abstract

In this talk, we focus on the relative Hilali conjecture proposed by Yamaguchi and Yokura, that for a continous map between two simply connected elliptic spaces $f : X \to Y$, dim Ker $\Pi_*(f)_{\mathbb{Q}} \leq$ dim Ker $H_*(f;\mathbb{Q}) + 1$. Our aim in this paper is to prove this conjecture for fibrations whose fibre has at most two-oddly generators. Also we show it in the case $H \to G \to G/H$, where G is a compact connected Lie group and H is a closed sub-Lie group of G

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