

## DIFFERENTIAL FORMS IN $C^\infty$ -RINGED SPACES

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$C^\infty$ -algebraic geometry, the differential analog of Grothendieck's algebraic geometry, was recently developed by Dominic Joyce in his Derived Differential Geometry program. In this framework, rings are replaced by  $C^\infty$ -rings, which are objects that generalize  $\mathbb{R}$ -algebras since they have not only the sum and product operations but also one operation for every smooth function  $f \in C^\infty(\mathbb{R}^n)$  and every  $n \in \mathbb{N}$ . Therefore, geometric objects such as ringed spaces have their  $C^\infty$  counterparts. In particular, we can define  $C^\infty$ -schemes and  $C^\infty$ -stacks, which generalize several notions of differentiable spaces such as smooth manifolds and orbifolds.

In this presentation, we will address some facts about the construction of a complex of differential forms on a locally  $C^\infty$ -ringed space. This construction, as in the case of manifolds, turns out to be functorial; therefore, forms can be integrated over simplices, and a version of Stoke's theorem holds.

**Keywords and keyphrases**—  $C^\infty$ -rings,  $C^\infty$ -ringed spaces,  $C^\infty$ -schemes, differential forms, Kähler differentials, De Rham Complex.

**Palabras y frases clave**— Anillos -  $C^\infty$ , esquemas -  $C^\infty$ , formas diferenciales, diferenciales de Kähler.

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## MORFISMOS DE ABEL-JACOBI, SERIES LINEALES Y SERIES LINEALES LÍMITE SOBRE CURVAS

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En esta charla trataremos algunos de los problemas sobre series lineales y series lineales límite sobre curvas algebraicas.

**Keywords and keyphrases**— Algebraic curves, Abel morphisms, linear series.

**Palabras y frases clave**— Curvas algebraicas, morfismos de Abel, series lineales.

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## CONSTRUCCIÓN DE CURVAS DE TIPO KUMMER CON MUCHOS LUGARES RACIONALES

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En esta charla presentaremos una variación al método desarrollado en el artículo “Reciprocal polynomials and curves with many points over a finite field” de Gupta, Mendoza y Quoos, para construir extensiones de tipo Kummer con muchos lugares racionales.

**Keywords and keyphrases**— Algebraic functions fields, Kummer theory.

**Palabras y frases clave**— Cuerpos de funciones algebraicas, lugares racionales, extensiones de Kummer.

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## REGULARIDAD DE SUBSECUENCIAS DE MISHCHENKO-FOMENKO EN $\mathcal{S}(gl_n)$

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El álgebra simétrica  $\mathcal{S}(gl_n)$  del álgebra de Lie  $gl_n$  de las matrices de tamaño  $n \times n$  sobre el cuerpo  $\mathbb{C}$  de los números complejos es el álgebra de polinomios en  $n^2$  variables. Para un elemento  $\xi$  del espacio dual  $gl_n^*$  sea  $\overline{\mathcal{A}}_\xi$  la subálgebra de Mishchenko-Fomenko de  $\mathcal{S}(gl_n)$  asociada al parámetro  $\xi$  y construida por el método de cambio de argumento. Un problema de interés en teoría de representaciones de álgebras de Lie es determinar si la subálgebra  $\overline{\mathcal{A}}_\xi$  es generada por una secuencia regular de polinomios. En esta charla mostraremos que ciertas subsecuencias de la subálgebra de Mishchenko-Fomenko en  $\mathcal{S}(gl_n)$  son secuencias regulares.

**Keywords and keyphrases**— Symmetric algebra, Mishchenko-Fomenko subalgebra, regular sequence.

**Palabras y frases clave**— Álgebra simétrica, subálgebra de Mishchenko-Fomenko, método de cambio de argumento, secuencia regular.

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## ON DIFFERENTIAL AND INTEGRAL CALCULUS OF FAMILIES OF QUANTUM ALGEBRAS

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Our purpose in this talk is to present some generalities about differential and integrable calculus for some families of quantum algebras. Our treatment follows the ideas presented by Brzeziński in several papers, together with some recent advances in the theory.

**Keywords and keyphrases**— Quantum algebras, differential calculus, integral calculus.

**Palabras y frases clave**— Quantum algebras, cálculo diferencial, cálculo integral.