UCA Universidad de Cádiz

Programa de Doctorado en Matemáticas

Actividad Formativa

ANUNCIO DE CICLO CONFERENCIAS

Introduction to Cauchy-Riemann Geometry

a cargo de

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The study of Cauchy-Riemann, CR in short, manifolds can be sourced back to Poincaré who studied the existence of biholomorphisms between two real hypersurfaces in $\mathbb{C}^2$. He proved that, in general, the answer is negative. Thus, a natural question of finding the invariants to distinguish one real hypersurface from another in $\mathbb{C}^2$ was raised. The question was completely solved by E. Cartan and was generalized by Moser and Chern. In the past few decades, many of mathematical researchers have been devoting the study of CR geometry and the results showed that CR manifolds and their study are indeed much plentiful and lie at the intersection of three mathematical disciplines: the theory of partial differential equations, multivariable complex analysis, and differential geometry. In this mini-course, we will discuss the fundamental tools of studying CR geometry.

Días: Lunes 18, martes 19, miércoles 20, jueves 21 y viernes 22 de febrero de 2019.
Lugar: Sala de Grados 2, Facultad de Ciencias, Campus de Puerto Real.
Horario: De 11:00h a 13:30h.
Más información: http://c101.uca.es/eventos

Organiza: Pr. José M. Espinar, Investigador Ramón y Cajal, Universidad de Cádiz.

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INSTITUTO ANDALUZ DE MATEMÁTICAS

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Abstract

The study of Cauchy-Riemann, CR in short, manifolds can be sourced back to Poincaré who studied the existence of biholomorphisms between two real hypersurfaces in $\mathbb{C}^2$. He proved that, in general, the answer is negative. Thus, a natural question of finding the invariants to distinguish one real hypersurface from another in $\mathbb{C}^2$ was raised. The question was completely solved by E. Cartan and was generalized by Moser and Chern. In the past few decades, many of mathematical researchers have been devoting the study of CR geometry and the results showed that CR manifolds and their study are indeed much plentiful and lie at the intersection of three mathematical disciplines: the theory of partial differential equations, multivariable complex analysis, and differential geometry. In this mini-course, we will discuss the fundamental tools of studying CR geometry, which basically cover (see Main References below)

- Chapter 1 and 2 (Dragomir and Tomassini)
- Chapter 7-12 (Boggess)
- Chapter 1 (Jocobowitz)

Some recent development of CR geometry related to my research will also be introduced in the last course.

Main References:

Books–

1. "Differential Geometry and Analysis on CR manifolds", Sorin Dragomir and Giuseppe Tomassini, Birkhauser publisher, Progress in Mathematics V246, 2006
2. "CR manifolds and the tangential Cauchy-Riemannian complex", Albert Boggess, Studies in Advanced Mathematics, 0-8493-71-52-X, 2000
3. "An introduction to CR structures", Howard Jocobowitz, Mathematical Surveys and Monographs 32, 1990

Article–

1. Tanaka, N. (1975). "A Differential Geometric Study on Strongly Pseudoconvex Manifolds". Lectures in Mathematics, Kyoto University. Tokyo: Kinokuniya Book Store. 9
2. Webster, Sidney, M. (1978). "Pseudo-hermitian Structures on a Real Hypersurface". Journal of Differential Geometry. 13: 25-41

3. Lee, John,M. (1988). "Pseudo-Einstein Structures on CR manifolds". American Journal of Mathematics. 110 (1): 157-178. doi:10.2307/2374543

4. Survey article: CR geometry in 3-D, Paul Yang, Chinese Annals of Mathematics, Series B, 2017, Volume 38, Issue 2, pp 695-710

Others references–

1. Introduction to the geometry of CR-manifolds, E.M. Chirka, 1991, Russian Math. Surveys 46:1 (1991), 95-197

2. Foliations in Cauchy-Riemann Geometry, Elisabetta Barletta, Sorin Dragomir, Krishan L. Duggal, Mathematical Surveys and Monographs v 140, AMS 2007

3. Geometry of CR-Submanifolds, Aurel Bejancu, ISBN 90-277-2194-7, 1986