The NINTH International Workshop

Applied Category Theory
Graph-Operad-Logic

The University of Texas at San Antonio
The Department of Mathematics
March 14–19, 2011, http://math.utsa.edu
http://indico.nucleares.unam.mx/conferenceDisplay.py?confId=475
http://www.cuautitlan.unam.mx/taller_matematicas/index.html

Version March 9, 2011. 5 days before Workshop
Downtown Campus Buena Vista Street and Frio Street

Contents

Daily course 8:30 – 9:00: Homology

Józef Przytycki, The George Washington University, Department of Mathematics, przytyck@gwu.edu, przytyck@gmail.com

- Homology of distributive structures:
  from Boolean algebras to spectral sequences
  1. Distributivity versus associativity
  2. Semigroup of binary operations.
  3. One term distributive homology
  4. Rack homology and quandle homology. Homology of a dihedral quandle as a case study
  5. Homology of Boolean algebras

1 Monday: Thermo- + hydro-dynamics + statistical mechanics

Robert M. Kiehn, Georgetown, Texas, near San Antonio. University of Huston. RKiehn2352@aol.com, http://www.cartan.pair.com
http://www22.pair.com/csdc/download/SanAntonioJan52011.pdf

- The category theory of topological thermodynamics Part 1 Distinguishable particles T0 or T2
- Turbulent and emergent solutions to the Navier-Stokes equations
- The category theory of topological thermodynamics. Part 2 Indistinguishable distributions. Not T0. Fifty significant results.

Hernando Quevedo, Universidad Nacional Autonoma de México, Instituto Ciencias Nucleares, quevedo@nucleares.unam.mx

- Geometrothermodynamics: thermodynamics with Riemannian structure

Jerzy Kocik, Southern Illinois University at Carbondale, Department of Mathematics, USA, jkocik@siu.edu
http://siu.edu/Kocik/jkocik/htm, jkocik@math.siu.edu

- Phenomenological thermodynamics revisited

Woodford William Zachary, Howard University, Washington US
wwzachary@earthlink.net. Jointly with Tepper L. Gill.

- Navier-Stokes equations: global in time solutins to the 3D incompressible fluid

Gonzalo Ares de Parga Alvarez, Instituto Politecnico Nacional, Escuela Superior de Fisica y Matematicas, Departamento de Fisica. Edificio 9, U. P. Adolfo Lopez Mateos, Zacatenco, Lindavista C.P. 07738 Mexico D.F., gadpau@hotmail.com

- A proposal for a relativistic statistical mechanics

Robert Owczarek, Enfitek, Inc., USA, Senior Scientist,
owczarek@hughes.net

- Geometric, group-theoretic, and analytic aspects of finite approximation of 2D Euler hydrodynamics

Hanna Ewa Makaruk, Los Alamos National Laboratory, USA
makaruk@hughes.net

- 3D perturbations of the inverse Abel transform

Benjamin Nieto, Universidad Autonoma Metropolitana
benjamin_n@prodigy.net.mx

- Statistical mechanics: applications of operads and graph theory

2 Tuesday: Loops + Relativity

Liudmila Sabinina Soboleva, Universidad Autónoma del Estado de Morelos, Cuernavaca, liudmila100@uaem.mx, liudmila@uaem.mx

- Moufang loops, operads and graphs of loops
- Trans-symmetric spaces in low dimensions

Larissa Sbitneva Tavdishvili, Universidad Autónoma del Estado de Morelos, Cuernavaca, México, larissa@uaem.mx, larissa@hotmail.com

- Equivalence of the categories of some classes of loops and homogeneous spaces.
- Bruck loops as transversals in reductive homogeneous spaces
- Quasigroups and loops

Jerzy Kocik, Southern Illinois University at Carbondale, Department of Mathematics, USA, jkocik@siu.edu
http://siu.edu/Kocik/jkocik/htm, jkocik@math.siu.edu

- Relativistic velocity addition formula done with stones and menhirs. Möbius maps over quaternions and more
- Formal tense systems: natural languages and relativity – unexpected parallels
- The world reflected in the Apollonian Gasket: relativity and spinors

Al Kracklauer, Weimar, Germany, af.kracklauer@web.de

- Time contortions in modern physics (advanced interaction, time dilation and nonlocality): causes and cures.

Tepper L. Gill, Howard University, Washington USA, tgill@howard.edu

- The Thomas program and the canonical proper-time theory
- Classical electrodynamics and proper-time

Cynthia Kolb Whitney, Natural Philosophy Alliance, and Galilean Electrodynamics, Editor in Chief, Arlington Massachusetts, USA
http://www.worldnpa.org/php/
galilean_electrodynamics@comcast.net

- Is our current relativity theory uniquely mandated?
- Maxwell theory and Galilean relativity

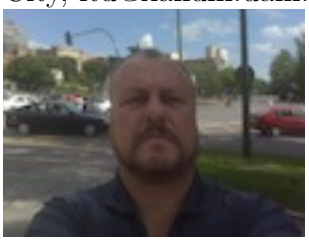
Zbigniew Oziewicz, Universidad Nacional Autonoma de México, Facultad de Estudios Superiores Cuautitlán, oziewicz@unam.mx
http://www.worldnpa.org

- Groupoid relativity - jointly with Bill Page
- Group, quasigroup, groupoid. Groupoid category. Homogeneous group-space as a groupoid category

Adan Rubén Rodríguez Domínguez, Universidad Autónoma de San Luis Potosí, Instituto de Física, adnrdz@dec1.ifisica.uaslp.mx

- Inertial radiation fields, jointly with Robert Yamaleev + Oziewicz

Leonardo Traversoni, Universidad Autonoma Metropolitana de M'exico City, ltd@xanum.uam.mx



- Quaternionic version of vortex methods
- Bubble implosion during cavitation. How to model it and its physical interpretations?

Aleksandr Tsybin, Philadelphia, USA. acibin@yahoo.com

- Agorithm of representation of prime numbers - determinants of the special kind

Tannia Cristal Vazquez Carrillo, UNAM, FESC
tanniacarter5@hotmail.com,

- Analysis of short-circuit in an electrical power system using field of complex numbers

3 Wednesday. Gravity + Frobenius + Apollonius

José Antonio Vallejo, Universidad Autónoma de San Luis Potosí, Facultad de Ciencias, Lateral Avenida Salvador Nava, C.P. 78290 San Luis Potosí, México. jvallejo@fc.uaslp.mx

- Universal spaces for Lie and Loday algebras
- Fedosov - Kontsevich quantization

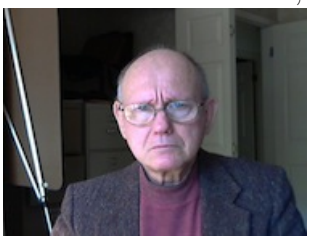
Patrick L. Nash, The Texas University at San Antonio, Department of Physics and Astronomy, patrick.nash@utsa.edu

- Second gravity, Journal of Mathematical Physics **51** (2010)

Andrzej Borowiec, Uniwersytet Wrocławski, Poland, borowiec@ift.uni.wroc.pl

- Quantum gravity phenomenology from deformed Minkowski space-time
- Twist deformation of Hopf algebras

Gregory Peter Wene, The University of Texas at San Antonio, Department of Mathematics, gpwene2009@hotmail.com, greg.wene@utsa.edu



- S_3-permuted Frobenius algebras
- Nonassociative Frobenius and Clifford algebra

Zbigniew Oziewicz, Universidad Nacional Autonoma de México, Facultad de Estudios Superiores Cuautitlán, oziewicz@unam.mx
http://www.worldnpa.org

- Frobenius algebras (jointly with Gregory Wene and William Page)
- Algebra for endofunctor
- Homological Calculus

William S. Page, Mallorytown, Ontario, Canada, bill.page@newsynthesis.org, http://algebraist.crowdvine.com/invitation/update/5b14(/profile/12668)

- General overview of symbolic calculations (lecture for students), free software etc
- Symbolic computation and 2- and 3-dimensional Frobenius algebras: Axiom, Maple, Singular
- Christoffel problem for singular metrics (with Oziewicz)

Jerzy Kocik, Southern Illinois University at Carbondale, Department of Mathematics, USA, jkocik@siu.edu
http://siu.edu/Kocik/jkocik/htm, jkocik@math.siu.edu

Jerzy Kocik received in August 2010 the Award from Mathematical Association of America for article *Disentangling a triangle* published in American Mathematical Monthly **116:3** (2009) 228–237. Excerpts from Award: ... the world's most elegant presentation of trigonometry's ... It is remarkable how this perspective on trigonometry has gone unnoticed for so long.

- Apollonian Gasket: geometry, number theory, and group theory
- Spinor description of Apollonian disk packings - Hall matrices - Number theory, geometry, group theory, topology

Zachery A. Sharon, UTSA

- Eliptic curves

Fernando Esteban Izaurieta Aranda, Universidad Catolica de la Santísima Concepción, Campus San Andrés, Departamento de Matematicas, 4090541 Concepción, Chile, fizaurie@ucsc.cl. UNAM, Instituto de Matematicas, Posgrado en Doctorado en Matematicas.

- Eleven-dimensioal supergravity and Chern-Simons theory

Dalia Cervantes Cabrera, Universidad Nacional Autonoma de México, Instituto de Ciencias Nucleares, México, daliac@nucleares.unam.mx, daliaprob@gmail,com

- Supersymmetry

Joseph Rothenberg,

4 Thursday. Knots + Algebraic topology + Philosophy + Computability

Louis H. Kauffman, Department of Mathematics and Computer Science, University of Illinois at Chicago, kauffman@uic.edu
http://front.math.ucdavis.edu/search?a=louis+kauffman

- Categorical pairs and the indicative shift
- Virtual knot
- Physical theory and Non-commutative Worlds

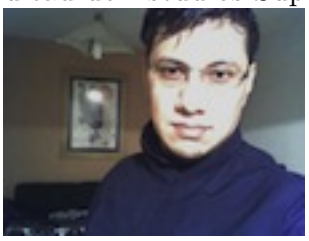
Robert M. Kiehn, Georgetown, Texas, near San Antonio. University of Huston. RKiehn2352@aol.com, http://www.cartan.pair.com
http://www22.pair.com/csdc/download/SanAntonioJan52011.pdf

- The category theory of topological thermodynamics. Part 2 Indistinguishable distributions. Not T0. Fifty significant results.

Mahima Ranjan Adhikari, University of Calcutta, Department of Pure Mathematics, India

- Applications of category theory to algebraic topology

Carlos César Jiménez, Universidad Nacional Autónoma de México, Facultad de Estudios Superiores Cuautitlán, ccesarjj@servidor.unam.mx



- Category theory, philosophy of language, and linguistics. *A categorical setting for Davidsonian-like theories of meaning*
- Category theory and philosophy of sciences. *Has category theory provided philosophy of science with significant new insights?*
- Category theory and linguistic - formal semantics for natural lenguages

Valentina Harizanov, George Washington University, Department of Mathematics, harizanv@gwu.edu
http://home.gwu.edu/∼harizanv/bibliography.html

- Introduction to computable model theory
- Computability theoretic complexity of isomorphisms of computable structures

Jerzy Kocik, Southern Illinois University at Carbondale, Department of Mathematics, USA, jkocik@siu.edu
http://siu.edu/Kocik/jkocik/htm, jkocik@math.siu.edu

- Game of light - Harmonic evolutions on graphs

Jing Wang, The George Washington University, Department of Mathematics, gwjwang@gwmail.gwu.edu

- Homology of a small category with coefficents in a functor: Introduction

Gregory Mezera, The George Washington University, Department of Mathematics, gtm@gwmail.gwu.edu

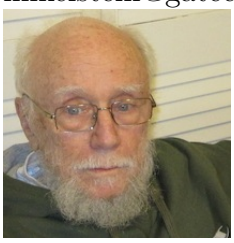
- Homology of a small category with coefficents in a functor: Khovanov type Homology on knots and graphs

Hilda Colin García, Universidad Nacional Autonoma de México, Facultad de Estudios Superiores Cuautitlán, Jefa del Departamento de Educación a Distancia, hildacolin@yahoo.com.mx

- Complex thinking and categorical thinking

5 Friday. Quantum Computing + Topos

David Ritz Finkelstein, Georgia Institute of Technology, Atlanta, USA, finkelstein@gatech.edu



- Cellular quantum gauge physics
- Quantum set theory

Louis H. Kauffman, Department of Mathematics and Computer Science, University of Illinois at Chicago, kauffman@uic.edu
http://front.math.ucdavis.edu/search?a=louis+kauffman

- Introduction to knots and to quantum information theory
- Khovanov homology, quantum algorithms and the Jones polynomial

Bertfried Fauser, University of Birmingham, School of Computer Science, and University of Tasmania, Bertffried.Fauser@gmail.com
http://www.cs.bham.ac.uk/ fauserb/

- What a topos is? Constructive mathematics and geometric logic.
- The Born map for the topos qbit. Topos: quantum-bit.
  Part I: Topos physics
- Part II: The Born map

Salvador Venegas Andraca, Tecnologico de Monterrey, Campus Estado de México, Departamento de Ingenieria Electrica, svenegas@itesm.mx, salvador.venegas@gmail.com, salvador.venegas-andraca@keble.oxon.org

- Quantum computing

Al Kracklauer, Weimar, Germany, af.kracklauer@web.de

- q-bit space & EPR and Bell experiments: geometric structure
- Recent results negating quantum nonlocal correlations
- Calculations/ derivation and simulations of the local generation of coincidences observed in tests of Bell inequalities.
- Stochastic electrodynamics: a paradigm for interpreting quantum mechanics

6 Saturday. March 19, 2011

8:30 am – 5:00 pm American Mathematical Society - Meeting

7:00 – no time limits, Banquet and official Clausula