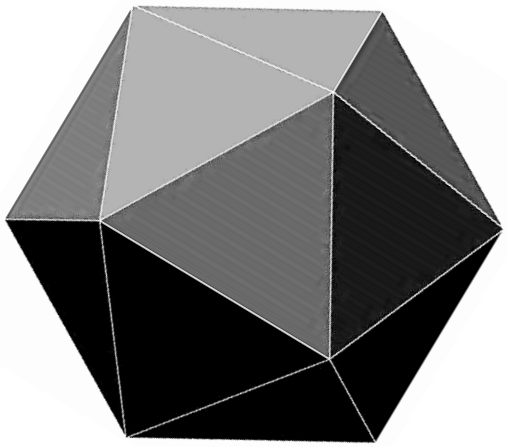
2018 Joint Meetings
Of The
Florida Section
Of The
Mathematical Association of America
And The
Florida Two-Year College Mathematics Association



Florida Atlantic University
Davie Campus

February 9 - 10, 2018

Florida Section of the Mathematical Association of America

2017 – 2018

Section Representative	Pam Crawford, Jacksonville University
President	Brian Camp, Saint Leo University
Past President	John R. Waters Jr., State College of Florida
Vice-President for Programs	Charles Lindsey, Florida Gulf Coast University
Vice-President for Site Selection	Anthony Okafor, University of West Florida
Secretary-Treasurer	David Kerr, Eckerd College
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Coordinator of Student Activities	Donald Ransford, Florida SouthWestern State College
Webmaster	Altay Özgener, State College of Florida
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VP for Programs-elect	Milé Krajčevski, University of South Florida
VP for Site Selection-elect	Joy D'Andrea, USF Sarasota-Manatee

Florida Two-Year College Mathematics Association

2017-2018

President	Altay Özgener, State College of Florida
Past President	Ryan Kasha, Valencia College
Vice-President for Programs	Don Ransford, Florida SouthWestern State College
Secretary	Sidra Van De Car, Valencia College
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Newsletter Editor	Rebecca Williams, State College of Florida
Membership Chair	Dennis Runde, State College of Florida
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Webmaster	Altay Özgener, State College of Florida
President-elect	Sandra Seifert, Florida SouthWestern State College

PROGRAM

Friday, February 9, 2018

Committee Meetings and Workshops

FL – MAA

9:30 – 11:00 **Executive Committee Meeting** **LA 150**

FTYCMA

9:30 – 10:30 **FTYCMA Officer's Meeting** **LA 132**

10:30 – 12:00 **FTYCMA Annual Business Meeting** **LA 132**

12:00 – 1:30 **New Members Luncheon and Mingle** **Student Union (BC54)**

Free lunch for first time attendees. This luncheon is our opening mingle to welcome new members and provide an opportunity to network with members from all over Florida. Pre-registration was required.

Registration

11:00 – **Registration & Publishers** **LA 124**

Sign in and browse the displays from several publishing representatives.

Welcome

1:40 – 2:00 **Welcoming Remarks** **Liberal Arts (LA[1]) 120**

C. Altay Özgener, President, FTYCMA
Nancy J. Rivers, Southeast Vice-President AMATYC
Brian Camp, President, FL-MAA

[1] The Liberal Arts building is designated BC49 on the official campus map.

Friday, February 9, 2018

2:00 – 2:50 Plenary Session LA 120

Jacqueline Jensen-Vallin – Associate Professor, Lamar University and Editor, MAA FOCUS

Let's Get Knotty!

3:00 – 3:45 Contributed Papers Session I

Full Session

Dan Ray – Carnegie Math Pathways LA 132

Increasing Student Success by Design: Creating Corequisite and Accelerated Courses

Ruthmae Sears and Caree Pinder (Graduate Student) – University of South Florida LA 233

Using MyLabsPlus Workspace to Examine Students Mathematical Reasoning

Daviel Leyva (Graduate Student) – University of South Florida LA 341

A Tour into Many-Valued Logic

Session A 3:00 – 3:20

Ovidiu Nechita (Undergraduate) – H.L. Wilkes Honors College, FAU LA 331

The Tower of Hanoi

Kevin James (Undergraduate) – University of North Florida LA 339

Menger's Theorem

Session B 3:25 – 3:45

Tiffany Nielander (Undergraduate) –
H.L. Wilkes Honors College, FAU LA 331

Mathematical Constraint in Traditional and Modern Poetic Forms

Milé Krajčevski – University of South Florida LA 339

Navigating mathematical formalism through visualization in Undergraduate Linear Algebra

3:00 – 4:45 Workshops

C. Altay Özgener - State College of Florida
Naimul Chowdhury (Undergraduate) – New College of Florida LA 303D

Elementary/Intermediate/Advanced LaTeX Workshop

3:00 – 4:45 Contributed Papers Session II

Full Session

Dennis Runde - State College of Florida LA 132

I Always Wanted to be a Math Teacher! Now What? Ten (or More) Professional Activities for Mathematics Teaching Faculty (of All Ages!)

Matthew Cuffaro – Independent Scholar LA 233

An Exhibition of Étale Fundamental Groups in Arithmetic Topology

Nely Hristova – Valencia College LA 341

Flipped Classroom Lessons for Order of Operations for Sets

Session A 4:00 – 4:20

Pascal Roubides – Broward College LA 331

Impact of Competency-based Polyparadigm Delivery on Retention and Success of Online Mathematics Learners

Carol Warner – Barry University LA 339

What do adult online students value most in a math for liberal arts course – the applicable or the theoretical?

Session B 4:25 – 4:45

Scott H. Demsky – Broward College LA 331
Alex Opritsa – Palm Beach State College

Extending the Domain of Certain Functions of a Real Variable

Austin Henriksen (Undergraduate) –
H.L. Wilkes Honors College, FAU LA 339

Machine Learning and Linear Systems

4:00 – 5:30 Student Events LA 152

Student Integration Contest (4:00-4:45) - Come test your integration abilities!

Student Problem Solving Contest (4:45-5:30) - Students test their problem solving skills.

4:45 – 5:30 Section Representative's Session LA 132

Pam Crawford – Jacksonville University

News and Notes from the MAA

4:45 – 5:30 Conference Break

Please visit the text book publishers in room **LA 124**!

5:40 – 6:30 Plenary Session LA 120

Paul Yiu – Florida Atlantic University

A Tale of Two Triangle Centers

6:45 – 8:30 Conference Banquet and Awards Ceremony Student Union (BC54)

Saturday, February 10, 2018

8:45 – 9:30 Contributed Papers Session III

Full Session

Rasika Rajapakshage (Graduate Student) –
University of Central Florida LA 132

Anisotropic Functional Laplace deconvolution

Patrick Bibby – University of Miami LA 233

Membership Tables: A Naïve Approach to Naïve Set Theory

Adebukola Adeyemi, Margaret Byrns, Carrie E. A. Grant, Kurt A. Sebastian – Flagler College LA 341

Course Coordination: A Necessary Requirement for Consistency

Session A 8:45-9:05

Joseph Kennedy, Talia Barraco, Stacey Burchette (Graduate Students), Anthony Okafor – University of West Florida LA 331

Hybrid Solution Methods to Combinatorial Optimization Problems

Jacci White, Monika Kiss, Kevin Murphy – Saint Leo University LA 339

Completing the major: oral exams, written exams, or a research project?

Session B 9:10-9:30

Paul Webb (Graduate Student) – University of West Florida LA 331

Completing Cyclic Latin Squares Using Mutually Orthogonal Latin Squares

C. Altay Özgener – State College of Florida LA 339

A Historical Account of the Pair Correlation for the Zeros of the Riemann Zeta Function

8:45 – 10:30 Workshops

Roger Isaac Blanco, Erika Zjevik, Victoria Goforth, Christine Kirchner – Miami Dade College LA 303D

Contextualization Increases Motivation to Learn--Leading to Higher Retention and Completion Rates

David Zoerb - South Florida State College LA 303F

LaTeX: An Introduction to Mathematics Word Processing

9:45 – 10:30 Contributed Papers Session IV

Full Session

Timothy W. Jones – Florida SouthWestern State College LA 132

Visualizing Zeta(n>=2) and Proving its Irrationality

Michael Reynolds – Indian River State College LA 341

Plotting Implicit Plane Curves in Microsoft Excel

Session A 9:45-10:05

Jaffar Ali Shahul-Hameed – Florida Gulf Coast University LA 233

Existence of Multiple Positive Radial Solutions to Elliptic Equations in an Annulus

Ramchandra Rimal (Graduate Student) – University of Central Florida LA 331

Estimation with Small Berkson Errors

Matthew Kimm (Graduate Student) - University of West Florida LA 339

Smallest Possible Additive-Multiplicative Magic Square

Session B 10:10-10:30

Menaka Navaratna, Jaffar Ali Shahul-Hameed –
Florida Gulf Coast University LA 233

Dynamics of Tumor Growth in the Presence of an Intervention Term

Pawan Gupta (Graduate Student) – University of Central Florida LA 331

Solution of linear ill-posed problems using random dictionaries

Julia Steinmetz (Graduate Student) – University of West Florida LA 339

A Connectedness Analysis of German Financial Institutions during the 2008 Financial Crisis

10:45 – 11:30 Contributed Papers Session V

Full Session

Josaphat Uvah – University of West Florida LA 132

Assessment of Students' Performance in Gatekeeper Mathematics Courses: A Case Study

Warren Wm. McGovern – H.L. Wilkes Honors College, FAU LA 152

On Commutative Rings with Identity

Carrie E.A. Grant – Flagler College LA 233

Engaging Simulations for Statistics Students

Roger Isaac Blanco, Erika Zjevik, Victoria Goforth, Christine Kirchner – Miami Dade College LA 341

Course Transformation, Equity and Retention through the Miami Dade College Instructional Learning Assistant Model

Session A 10:45-11:05

Caitlin Walsh, Brooke Snoll, Amanda Luce (Undergraduates) –
Saint Leo University LA 331

Saint Leo University's Math Club

Rajita Ranasinghe (Graduate Student) –
University of Central Florida LA 339

An Application of the Askey-Wilson operator: Overconvergence

Session B 11:10-11:30

Amanda Luce (Undergraduate) – Saint Leo University LA 331

INCENTIVES, INCENTIVES, INCENTIVES: A Time-Series Analysis of Financial Factors on Homeownership Rates

Don Ransford – Florida SouthWestern State College LA 339

Using Color to Enhance the Teaching of Mathematics

11:45 – 12:35 Plenary Session LA 120

Michael Pearson – Executive Director, Mathematical Association of America

Solving Problems: MAA American Mathematics Competitions and Evolving Views of Mathematics Education

12:40 – 12:50 Closing Remarks LA 120

Altay Özgener, President, FTYCMA
Brian Camp, President, FL-MAA

1:00 – 2:30 Luncheon and FL-MAA Business Meeting Student Union (BC54)

ABSTRACTS

Contributed Papers Session I

Full Session

Dan Ray – Carnegie Math Pathways

Increasing Student Success by Design: Creating Corequisite and Accelerated Courses

This session will focus on design strategies for creating corequisite and accelerated courses using research-based principles of effective mathematics teaching for developmental and college-level math courses. The design considerations being discussed include identifying targeted students, the integration of social and emotional supports, the alignment of the corequisite curriculum and pedagogy with the college level course, as well as how to align courses to college and state learning goals for transferability. Additionally, a case will be made for flexibility in the design of corequisite courses to ensure students have the level of support that matches their needs. In-depth examples will be shared of different approaches from colleges in a nationwide network focused on developmental mathematics pathways and the lessons learned from both design and implementation. Data will be presented that demonstrates how course design and implementation impact student success.

Ruthmae Sears and Caree Pinder (Graduate Student) – University of South Florida

Using MyLabsPlus Workspace to Examine Students Mathematical Reasoning

In this presentation we will describe how we use MyLabsPlus workspace to gain insight into Intermediate Algebra students mathematical conceptions. We will highlight frequencies of types of errors observed, and strategies that could be used to address the identified errors.

Daviel Leyva (Graduate Student) – University of South Florida

A Tour into Many-Valued Logic

Some would claim that all we do, as mathematicians, rests on the somewhat firm foundation that logic (and set theory) provides. For over 2000 years the prescription passed down to us via Aristotle, the founder of formal logic, has reigned as the supreme law of the land; however, like most human prescriptions, it is not absolute and has its own limitations. In this talk, I would like to motivate the need for an expansion of classical logic to many-valued logical systems – in particular, those of C.S. Peirce, J. Łukasiewicz, D.A. Bochvar, and S.C. Kleene – as well as their dependence on interpretation and how they compare with classical logic.

Session I-A

Ovidiu Nechita (Undergraduate) – H.L. Wilkes Honors College, FAU

The Tower of Hanoi

The Tower of Hanoi is a mathematical game where the player must transfer a tower of different sized disks from one peg to another in the least number of moves, while always keeping larger disks above smaller ones; a variation of this game is the Double Tower of Hanoi, in which every disk has been duplicated. We will start by deriving the minimum number of moves required to complete these puzzles and we investigate how this number varies as we increase the number of pegs to four from the usual three. Finding these numbers will give the player the most efficient way to win the game.

Kevin James (Undergraduate) – University of North Florida

Menger's Theorem

In 1927, Karl Menger proved his famous graph connectivity characterization theorem as a lemma he needed for a theorem in curve theory. We will discuss various versions of Menger's theorem, generalization, a proof, and some applications.

Session I-B

Tiffany Nielander (Undergraduate) – H.L. Wilkes Honors College, FAU

Mathematical Constraint in Traditional and Modern Poetic Forms

Bertrand Russel once said, "The true spirit of delight, the exaltation, the sense of being more than man, which is the touchstone of the highest excellence, is to be found in mathematics as surely as poetry." Poetry and mathematics are inherently linked through aesthetics and counting at the most basic level, in fact, but these connections can be expanded further to formal constraints in poetry. Many traditional poetic forms already contain certain intrinsic mathematical structures, such as the sestina which is based on permutations of words. There are also modern forms which have been explicitly based on mathematical structures; some well-known examples are the Fib, a form of limerick based on the Fibonacci sequence, and the N+7, an algorithm which creates new poetry by replacing words from an existing piece with the seventh word following it in the dictionary.

Milé Krajčevski – University of South Florida

Navigating mathematical formalism through visualization in Undergraduate Linear Algebra

Unequivocally, the notions of Linear Algebra have emerged as some of the most important notions in the undergraduate curriculum. Research has shown that students struggle with the abstract notions such as linear transformation, subspace, or eigenvector. We present a different perspective on how these notions emerge naturally when we see drawing as a part of an activity that incorporates modeling and manipulatives in the curriculum. We present a set of instructions on how to use learner-generated drawings to achieve some of the learning goals in an Undergraduate Linear Algebra course. We also report on our research on investigating drawing as a cognitive strategy in undergraduate mathematics.

Workshops – Friday

C. Altay Özgener - State College of Florida
Naimul Chowdhury (Undergraduate) – New College of Florida

Elementary/Intermediate/Advanced LaTeX Workshop

This workshop will introduce some packages of the typesetting program LaTeX.

Depending on the attendees, we will adjust the level of the workshop. We would like our attendees to create an account at https://www.sharelatex.com/ prior to the workshop.

Contributed Papers Session II

Full Session

Dennis Runde - State College of Florida

I Always Wanted to be a Math Teacher! Now What? Ten (or More) Professional Activities for Mathematics Teaching Faculty (of All Ages!)

After landing their dream job, new teachers may ask, "Now What?" Or after 27 years, veteran teachers may ask, "Now What?" This talk will present 10 professional growth opportunities for Mathematics Teaching Faculty. These opportunities span a wide spectrum of teaching experience level, so all attendees can benefit!

Matthew Cuffaro – Independent Scholar

An Exhibition of Étale Fundamental Groups in Arithmetic Topology

This talk explains the étale fundamental group and its purpose, along with some calculations. The audience will be able to understand its motiviation and appreciate its importance in arithmetic topology, where wonderful analogies are drawn between the embedding the spectra of arithmetic objects and the nontrivial embedding of spheres into larger spheres (knots). To conclude, the general étale fundamental group will be introduced as a candidate for generalizing phenomena in arithmetic topology.

Nely Hristova – Valencia College

Flipped Classroom Lessons for Order of Operations for Sets

The presenter developed flipped classroom lessons on Sets to improve MGF1106 College Mathematics students' abilities to solve problems with a complement and an intersection, a complement and a union, and a complement, an intersection and a union. The project was implemented in the fall of 2017. Qualitative and quantitative data was collected. The presenter will compare the teaching approaches in the experimental and control groups, and share the analyzed data.

Session II-A

Pascal Roubides – Broward College

Impact of Competency-based Polyparadigm Delivery on Retention and Success of Online Mathematics Learners

The author has been awarded a small grant to conduct a research study aiming at finding evidence of differences in academic performance between traditional online mathematics College Algebra courses at the post-secondary level of education and equivalent online courses based on a polyparadigm model of delivery structured around a hybrid competency-based learning approach. The research question that this study set out to address is as follows: Can the online College Algebra curriculum at the author's institution, a large publicly supported state college in the southeastern United States, delivered via a hybrid polyparadigm competency-focused model, produce statistically significant improvement in retention and success rates against the current delivery of the same course? Preliminary results suggest that this may actually be the case.

Carol Warner – Barry University

What do adult online students value most in a math for liberal arts course – the applicable or the theoretical?

This presentation examines the results of a 5-year study of every adult, working student enrolled in the online Survey of Mathematics course at Barry University. Dr. Warner shares this compilation of her students' reflection papers – the content they most valued learning for their profession, and the content they most enjoyed learning. Are they one and the same?

Session II-B

Scott H. Demsky – Broward College
Alex Opritsa – Palm Beach State College

Extending the Domain of Certain Functions of a Real Variable

The domain of the function $f(x) = \cos(\sqrt{x})$ is the set of all non-negative real numbers. In this talk, we will show how to use power series to extend this function to an analytic function defined on the entire real line. We will then show how this analytic extension of $f(x)$ makes it easier and quicker for calculus students to compute derivatives of $f(x)$ at the origin. We will moreover describe the process of extending the domain of any function of the form $g(\sqrt{x})$ for a given, even analytic function $g(x)$.

Austin Henriksen (Undergraduate) – H.L. Wilkes Honors College, FAU

Machine Learning and Linear Systems

The past decade has seen a massive surge in both the power and prevalence of machine learning, the use of algorithms to teach systems how to interpret and manipulate data. This trend shows no sign of slowing down either, as with each passing year they only become faster and more expansive in their capabilities. This is most evidenced by how huge an impact they've already had, despite being such a new field, in everything from diagnosing cancer to predicting sport's matches. In this talk, we give a brief look at the history of machine learning and artificial intelligence, and delve into the inner workings of the most widely used machine learning algorithm, neural networks. These are represented as vast linear systems, the likes of which we will show both how to create, and the methods by which they're refined into the data analysis experts that they are today.

Contributed Papers Session III

Full Session

Rasika Rajapakshage (Graduate Student) – University of Central Florida

Anisotropic Functional Laplace deconvolution

In the present paper we consider the problem of estimating a three-dimensional function f based on observations from its noisy Laplace convolution. Our study is motivated by the analysis of Dynamic Contrast Enhanced (DCE) imaging data. We construct an adaptive wavelet-Laguerre estimator of f, derive minimax lower bounds for the L2-risk when f belongs to a three-dimensional Laguerre-Sobolev ball and demonstrate that the wavelet-Laguerre estimator is adaptive and asymptotically near-optimal in a wide range of Laguerre-Sobolev spaces. We carry out a limited simulations study and show that the estimator performs well in a finite sample setting. Finally, we use the technique for the solution of the Laplace deconvolution problem on the basis of DCE Computerized Tomography data.

Patrick Bibby – University of Miami

Membership Tables: A Naïve Approach to Naïve Set Theory

In naïve (i.e., informal) set theory, a membership table is similar to a truth table in symbolic logic. In this presentation, it will be shown how to construct membership tables for unions, intersections, complements, the empty set, the universal set, as well as more complicated expressions. It will also be shown how membership tables can be used to verify various set properties, such as DeMorgan's laws, the distributive properties, the absorption properties, and many, many more. Finite math students and discrete math students should find this topic entertaining, engaging, and enlightening.

Adebukola Adeyemi, Margaret Byrns, Carrie E. A. Grant, Kurt A. Sebastian – Flagler College

Course Coordination: A Necessary Requirement for Consistency

Beginning in the fall term 2016, all students entering Flagler College are required to complete MAT 223 Statistics for graduation. This change in the college's general education requirement led a group of instructors to find a way to provide consistency in the classroom while at the same time ensuring high standards of excellence.
In this session, we will discuss the need of course coordination, the level of coordination used, and the outcomes we have experienced over the last three semesters. We will also explain how the course is designed including textbook selection, final group project and other assessments. Lastly, we will share not only how the coordination has improved the course, but how it has created a strong team of instructors working together.

Session III-A

Joseph Kennedy, Talia Barraco, Stacey Burchette (Graduate Students), Anthony Okafor – University of West Florida

Hybrid Solution Methods to Combinatorial Optimization Problems

Defying solution by exact algorithms, combinatorial optimization problems often require use of heuristic methods to produce near optimal solutions in a relatively short amount of time. Common problems include the Traveling Salesman Problem, Knapsack Problem, and the Minimum Spanning Tree Problem. With a plethora of methods available, performance is often improved when elements of different heuristics are combined. Metaheuristic methods such as Simulated Annealing, Tabu Search, and Genetic Algorithms have proven to be effective in finding quality solutions across the set of combinatorial optimization problems. We propose a hybridization of these methods applied to the Travelling Salesman Problem and its extensions to improve performance as compared to benchmarks established. Specifically, we exploit the ability of simulated annealing to escape local optima while incorporating the techniques of generating solutions from genetic algorithms.

Jacci White, Monika Kiss, Kevin Murphy – Saint Leo University

Completing the major: oral exams, written exams, or a research project?

Capstone experiences can vary from research, service, or artistic projects, to oral or written exams. We will focus on advantages and disadvantages of written exams, oral exams, and projects. In addition, we will share a basic process for a senior capstone project, and assessment rubrics for exams.

Session III-B

Paul Webb (Graduate Student) – University of West Florida

Completing Cyclic Latin Squares Using Mutually Orthogonal Latin Squares

Mutually Orthogonal Latin Squares are a fairly recent subject in graph theory. One of the most famous problems involving Mutually Orthogonal Latin Squares is the thirty-six officers problem. Euler conjectured that it was not solvable and its status remains so until 1901 when Gaston Tarry. An interesting property of Mutually Orthogonal Latin Squares is that many of them a cyclic in nature. We use this property to determine the conditions that are required for different classes of partially complete Latin squares to be completed cyclically. In doing so, we also provide methods for completing these squares cyclically.

C. Altay Özgener – State College of Florida

A Historical Account of the Pair Correlation for the Zeros of the Riemann Zeta Function

We will start with the Hilbert–Pólya conjecture about the zeros of $\zeta(s)$ on the critical line. In the early 1970s, H. L. Montgomery assuming the Riemann hypothesis (RH), found how zeros behave on the critical line. Enter, Freeman Dyson… (you have to come to the talk to hear the rest.)

Workshops - Saturday

Roger Isaac Blanco, Erika Zjevik, Victoria Goforth, Christine Kirchner – Miami Dade College

Contextualization Increases Motivation to Learn--Leading to Higher Retention and Completion Rates

Student interest and student desire to wrestle with content remain as central to all performance goals at today's two-year colleges. Research from Perin (2011) confirms that contextualized content helps build persistence in today's learners, specifically "The method of contextualization is grounded in a conceptual framework relating to the transfer of skill and student motivation."

This session will empower professors to develop real-life scenarios and problem situations applicable to their community, using local names and industries to add motivating context to mathematical concepts. Participants will also be provided with Miami Dade College competencies for Intermediate Algebra, a suggested Scope of Work, different curricular components including the Co-Requisite Model, and a sample end product. Simply put, "A well-contextualized course will continue to build learners' skills in all facets of a subject while engaging students in areas of interest deepening their participation and commitment to learning" (Chaplot et.al. 2013).

David Zoerb - South Florida State College

LaTeX: An Introduction to Mathematics Word Processing

Tired of Microsoft Equation Editor? Looking for a way to create mathematics documents without inserting graphics to Word? During this session attendees will be able to learn about LaTeX, uses in classes, lesson prep, student accessibility, and applications. LaTeX is a word processor used for most mathematics and chemistry books, but allows for a cleaner and more streamline result. LaTeX can provide students with an interdisciplinary lesson introducing computer programming and can be used on any operating system platform with or without installation of software (which is open source). Attendees are encouraged to bring their laptops and will be provided with all necessary starting files.

Contributed Papers Session IV

Full Session

Timothy W. Jones – Florida SouthWestern State College

Visualizing Zeta(n>=2) and Proving its Irrationality

Using concentric circles with equally spaced points on them and a radius from the origin of these circles, sector areas of all rational values between 0 and 1 are generated. The sector areas corresponding to the terms of zeta(2)-1 are added by rotating each new term and forming a new radius. As the new radius does not go through points on the circles forming the terms of the partial, we can visualize how each partial sum cannot be given as a rational sector area using the denominators of the partial's terms. For the limiting case, the infinite series, a modification of Cantor diagonal method is used. We show that zeta(2) is irrational. As other values of zeta(n) can be substituted for n=2, we conclude zeta(n>=2), all n, are irrational.

Michael Reynolds – Indian River State College

Plotting Implicit Plane Curves in Microsoft Excel

This talk with explore the graphing capabilities of Microsoft Excel through its data-plotting functionality. Particular focus will be given to implicit plane curves, specifically quadratic, cubic and quartic plane curves. Requisite background on the theory of these plane curves will also be given, to make this talk accessible to a general audience.

Session IV-A

Jaffar Ali Shahul-Hameed – Florida Gulf Coast University

Existence of Multiple Positive Radial Solutions to Elliptic Equations in an Annulus

In this talk, we will talk about existence of at least two positive radial solutions of the equation

$$-\Delta u = \lambda g(|x|) f(u), \qquad R_1 < |x| < R_2$$

$x \in R^N$, $N \geq 2$ subject to a linear mixed boundary condition at R_1 and R_2. We use Leggett-Williams multiple fixed point theorems to obtain several sufficient conditions for the existence of positive solutions.

Ramchandra Rimal (Graduate Student) – University of Central Florida

Estimation with Small Berkson Errors

Consider a sample of i.i.d. variables $Y_1, ..., Y_n$ where $Y_i = X_i + \xi_i$ where X_i and ξ_i are i.i.d., unobservable and ξ_i's has a known pdf f_ξ . The variable of interest in this model is $W = X + \eta$ where η has a known pdf f_η and η and X are independent. The variable of interest W is not observable but only the surrogate X can be measured. The error variable η here is known as Berkson error. The objective is estimation of the pdf f_W of W based on observations $Y_1, ..., Y_n$. The problem is known as density estimation with Berkson errors and has applications in econometrics, astronomy, biometrics, medical statistics, image reconstruction. It is known that presence of Berkson errors improves the accuracy of estimation of f_W . The focus of our work is investigation of the case when Berkson errors have variance σ^2 which may be very small. We construct kernel estimators of f_W and select the optimal bandwidth that delivers the bias-variance balance for various scenarios of f_ξ and f_η and values of σ.

Matthew Kimm (Graduate Student) - University of West Florida

Smallest Possible Additive-Multiplicative Magic Square

Magic squares are a popular construction in recreational mathematics. The addition of a multiplicative magic condition to additive magic squares forms an additive-multiplicative magic square. The least order for which such a construction exists has not yet been determined. This research attempts to establish a least order for which this interesting construction exists. The properties of such a construction will be examined and computer search methods will be employed in an attempt to confirm the current least order or establish a new least order.

Session IV-B

Menaka Navaratna, Jaffar Ali Shahul-Hameed – Florida Gulf Coast University

Dynamics of Tumor Growth in the Presence of an Intervention Term

Recent work in computational biology has led to the development of a universal mathematical model of tumor growth based on metabolism. Generally, the growth of tumor mass is represented as $\frac{dm}{dt} = f(m,t)$. We introduce an intervention term, c, to this computational model in order to analyze tumor growth in adverse cellular conditions, such that $\frac{dm}{dt} = f(m,t) - c$. We assess the intervention term, c, as a constant and as a function of time. These simulations suggest that tumor treatment does not, in general, cause a monotonic decrease in mass and this finding is reflected in experimental data from the cancer literature. Our findings have potential applications for the development of cancer treatment by demonstrating that the duration and quantity of treatment can be optimized to suppress tumor growth, prevent metastasis, and prepare for tumor excision.

Pawan Gupta (Graduate Student) – University of Central Florida

Solution of linear ill-posed problems using random dictionaries

In the present paper, we consider an application of overcomplete dictionaries to the solution of general ill-posed linear inverse problems. In the context of regression problems, there has been an enormous amount of effort to recover an unknown function using such dictionaries. One of the most popular methods, lasso, and its versions, is based on minimizing the empirical likelihood and unfortunately, requires stringent assumptions on the dictionary, the so-called, compatibility conditions. Though compatibility conditions are hard to satisfy, it is well known that this can be accomplished by using random dictionaries. In the present paper, we show how one can apply random dictionaries to the solution of ill-posed linear inverse problems. We put a theoretical foundation under the suggested methodology and study its performance via simulations and real- data examples.

Julia Steinmetz (Graduate Student) – University of West Florida

A Connectedness Analysis of German Financial Institutions during the 2008 Financial Crisis

For core financial market activities like risk management and asset pricing, a suitable measure of connectedness can provide valuable insights of financial markets and helps to understand how institutions influence each other. In particular, depending on contractual obligations between financial institutions, the financial distress at a bank with large systemic impact is likely to also cause distress at other institutions, a phenomenon called contagion.
We investigate the connectedness among German financial institutions during the global financial crisis 2007-2009, with a focus at its height in September 2008 marked by the bankruptcy of Lehman Brothers. Using the definition of connectedness, as proposed by Diebold and Yilmaz (2014), our approach relies on analyzing multiple time series of volatilities by a vector autoregressive (VAR) model and a generalized forecast error variance decompositions. This approach provides several meaningful measures of connectedness and allows for static (average), as well as dynamic (daily time-varying) analyses.

Contributed Papers Session V

Full Session

Josaphat Uvah – University of West Florida

Assessment of Students' Performance in Gatekeeper Mathematics Courses: A Case Study

We present the results of a case study on students' performance in mathematics and statistics gatekeeper courses. Having identified the gatekeeper courses in lower division mathematics and statistics that are taught at the University of West Florida (UWF), we adapted existing methods of assessment to assess the group performance of students who took those classes during a recent four-year period. We performed annual assessment of group performance of students in those classes during the period of interest. Results of these studies show that the students' performance improved dramatically. We discuss the strategies we deployed and the challenges that we encountered in the process. We shall discuss some procedures for assessing and reforming curricula at the general education level.

Warren Wm. McGovern – H.L. Wilkes Honors College, FAU

On Commutative Rings with Identity

In an undergraduate Modern Algebra course, students learn about some fundamental properties of commutative rings with identity. One of my favorite examples of a commutative ring with identity is $C(X)$ the ring of continuous real-valued function on a topological space X. I will try to explain some of the many beautiful features of this ring and how it appeals to mathematicians of different persuasions (e.g. algebraists, analysts, and topologists).

Carrie E.A. Grant – Flagler College

Engaging Simulations for Statistics Students

Incorporating active learning into an introductory statistics course has been one of the leading course redesign practices that I have used in the past decade or so. I am constantly looking for ways to incorporate activities that help students gain a deeper understanding of statistical concepts. Using simulations to introduce hypothesis tests has proven to be a successful tool in achieving this goal.
I use a variety of simulations in my courses; most follow a similar general format. First students conduct a hands-on physical simulation, second data is gathered from all students in the classroom to look at the overall picture, and third a computer simulation is conducted to see what happens in the long run.
In this session, participants will be introduced to three or more simulation activities that I currently use in my courses and will leave being able to use this activities in their courses as well.

Roger Isaac Blanco, Erika Zjevik, Victoria Goforth, Christine Kirchner – Miami Dade College

Course Transformation, Equity and Retention through the Miami Dade College Instructional Learning Assistant Model

If the basic improvement in teaching Intermediate Algebra can be calculated as an area, how can that area be bolstered? Further gains can be achieved by employing energized student role models as Instructional Learning Assistants (ILAs). Data from a broad swath of post-secondary institutions attest to the effectiveness of these perceived peers at increasing active learning and improving outcomes. We present both our current research findings and best practices for college math departments considering this proven innovation, in order to not only calculate that area but to expand it into a perfect square!

Under the ILA Model, we reveal how the course content gets reviewed, how engagement techniques can be taught, and how ILAs assist with Early Alerts and Intervention Systems. The faculty-led class, the group work with ILAs, and the one-on-one tutoring by ILAs create a fully-supported environment for student success—that is what we call a perfect square!

Session V-A

Caitlin Walsh, Brooke Snoll, Amanda Luce (Undergraduates) – Saint Leo University

Saint Leo University's Math Club

As members of Saint Leo University's Math Club's executive board, we have strived to make the club a more prominent part of campus life. Through new marketing techniques, a wide variety of social and educational programs, and successful fundraisers, the executive board has been able to make the math club a bigger part of the Saint Leo community and fundraise enough money to bring many members to this math conference. We plan to discuss some of the progress we have made as a club, programs and fundraisers we have developed in the past, successes and failures, and plans for the future.

Rajita Ranasinghe (Graduate Student) – University of Central Florida

An Application of the Askey-Wilson operator: Overconvergence

In 1985, Askey and Wilson introduced the Askey-Wilson operator, D_q, $0 < q < 1$, in their study of a class of orthogonal polynomials, the Askey-Wilson polynomials. It is a degree lowering operator and can be considered as a discrete version of the ordinary derivative. The definition of D_q presented by Askey and Wilson uses values of a function at points in the complex plane. To make it applicable to more general classes of functions than the space of polynomials, Brown and Ismail defined D_q on a subset of the so-called q-differentiable functions of the L^2 space on $[-1,1]$ with weight $(1-x^2)^{-1/2}$. A natural question to ask is: How smooth must a function be to ensure that it is q-differentiable ? In this connection, we give a precise description of all functions that are q-differentiable in terms of the analytic continuation of the functions.

Session V-B

Amanda Luce (Undergraduate) – Saint Leo University

INCENTIVES, INCENTIVES, INCENTIVES: A Time-Series Analysis of Financial Factors on Homeownership Rates

Buying a home has become more of a viable option over the lifetime much of the adult population in the United States when considering financing options available in the modern housing market. This inspired the following investigation to see whether key market factors such as average income, average home sales price, and average interest rates impact the Homeownership rate in the United States. Data from 1975 to 2016 is analyzed through multiple statistical models to see that there is a significant impact from these factors on the Homeownership rate, but that there are conflicting results that do not all make economic sense. Further investigation explores the statistical options of econometric models, and what factors help show the best-fit model.

Don Ransford – Florida SouthWestern State College

Using Color to Enhance the Teaching of Mathematics

This presentation will focus on how color can be used to enhance the teaching of different mathematical concepts. Examples will be given from algebra/precalculus, trigonometry, calculus, and liberal arts mathematics. The examples are intended to be useful in both "high tech" and "low tech" classrooms.

Plenary Sessions

Jacqueline Jensen-Vallin – Associate Professor of Mathematics and Director of First-Year Mathematics Education, Lamar University, and Editor, MAA FOCUS

Bio: After earning her PhD in low-dimensional topology from the University of Oregon in 2002, Jacqueline Jensen-Vallin joined the faculty at Sam Houston State University in Huntsville, TX, where she received tenure and promotion to Associate Professor in 2008. She spent four years at Slippery Rock University in Slippery Rock, PA, and is now at Lamar University in Beaumont, TX. While at SHSU, she founded the Texas Undergraduate Mathematics Conference (which has now become a regional meeting at a rotating venue, and has just held its thirteenth meeting) and the Piney Woods Lecture Series, which ran at SHSU for 3 years. She has successfully engaged undergraduate students in research; involved students in the larger mathematical community by taking them to local, regional, and national conferences; has served as a Pi Mu Epsilon Councillor; and served on the Mathematical Association of America Committee on Undergraduate Student Activities and Chapters and on the MAA Committee on Sections. She is currently the Director of the First Year Mathematics Experience at Lamar University and editor of MAA FOCUS, the newsmagazine of the MAA. In addition to her mathematical career, she is a knitter, and a dance mom to her twins.

Let's Get Knotty!

My early interest in numbers and patterns lead me down a (nonlinear) path to mathematics, which has led me to the twisty world of knots. Mathematically, knots are non-intersecting closed curves in space. We will use sequences and patterns to explore this world and play with a classic question in knot theory - given a knot diagram, how do I identify the knot? There will be plenty of examples, conjectures, and fun!

Paul Yiu – Professor of Mathematical Sciences and Director, Master of Science in Teaching Mathematics program, Florida Atlantic University

Bio: Paul Yiu came from Hong Kong. He got his PhD in 1985 in Algebraic Topology at the University of British Columbia, under the direction of Kee Yuen Lam. After a few years at the Ohio State University and the University of Hong Kong, he came to FAU in 1990, and has been Professor of Mathematical Sciences since 2000. Beginning 2001, he edits the electronic journal Forum Geometricorum devoted to classical Euclidean Geometry.

A Tale of Two Triangle Centers

Triangle centers have been known since ancient times. In the 18th Century, Euler started a new chapter of geometry by showing that the circumcenter, centroid, and orthocenter of a triangle are collinear (Euler line). After a brief introduction to barycentric coordinates, we examine two triangle centers each as the point of concurrency of three Euler lines, and see how they relate to each other and to other triangle centers.

Michael Pearson – **Executive Director, Mathematical Association of America**

Bio: Michael Pearson received a bachelor's degree from the University of Mississippi in 1980, a master's degree from Mississippi State University in 1982 and a Ph.D. (Harmonic Analysis) from The University of Texas at Austin in 1989. Prior to joining the MAA (in 2002), he served on the faculty at Florida International University (1989-1992) and Mississippi State University (1992-2002).

As Executive Director, Michael provides leadership to further the mission of the MAA. As a long-time member of the MAA, he is delighted to have the opportunity to work closely with colleagues who share the sense of community and common purpose that he sees as the fundamental strength of the Association.

Solving Problems: MAA American Mathematics Competitions and Evolving Views of Mathematics Education

Through its years as the American High School Mathematics Examination and now as the AMC, MAA competitions programs illustrate the evolving views of what constitutes effective mathematical problem solving, as well as identifying and cultivating mathematical talent. We'll take a leisurely tour through more than a half-century of the Association's efforts to advance mathematics through competitions.

NOTES OF INTEREST

FAU-Davie is a smoke-free zone

Connecting to Wifi:

1. Choose **FAUguest** from available networks
2. Use your cell phone number as user ID
3. A password will be sent to your phone as a text message
4. This login can then be used to access wifi on other devices if desired

SPECIAL THANKS TO

Florida Atlantic University

Mr. Anthony Abbate, AIA, NCARB
Associate Provost, Broward Campuses

The Conference Committee:

Fred Hoffman, Professor of Mathematical Sciences
Maria Provost, Events and Recruitment Coordinator
Rainer Steinwandt, Chair, Department of Mathematical Sciences
Jane Morgan, Director of Operations, Broward Campuses
Rochelle Maitland, Coordinator, Campus Operations for the Broward Campuses

Vendors:

Pearson
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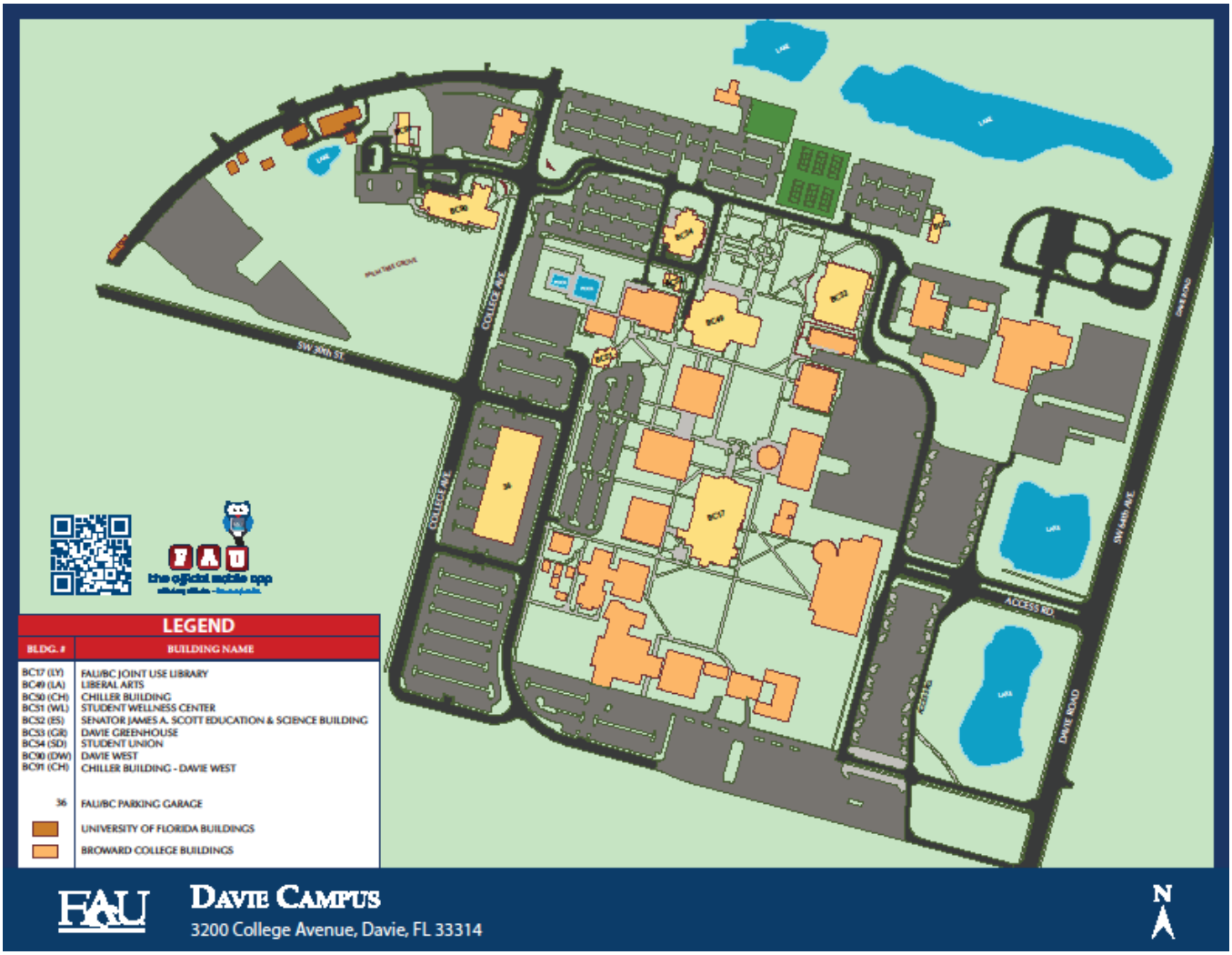
FAU Davie Campus Map (pdf)



FAU Davie Campus (Google Maps)