Brookhaven National Laboratory
March 24-25, 1995

The Spring circus at BNL was hosted by Charlie Goldstein and Joe Passiak. On Friday night, circus members had an excellent dinner at the Courtyard Cafe, one of the top 10 restaurants on Long Island. Twenty-four circus members attended, with twelve giving talks. The following poem was dedicated to Ivo, on his upcoming move to Texas.

"Remember the Alamo"
- well, not exactly
by R. Furr

I had a strange dream last night
about the Alamo.
I saw Davy Crockett, Daniel Boone,
and a guy they called Ivo.

Then Ivo spoke in his distinctive style,
but in an accent I didn't know.

"Howdy, pan-dressers, and welcome to
the first F.E. Rodeo."

Attendees

- John
- B. Kellogg
- Rick Seck
- Varda Feldstein
- David Richert
- Joe Posnak

- Shangyou Zhang
- Jinshui Qin
  - Susanne Brenner
  - Xiaobo Liu
  - Frank Thumlbury
- Thomas J. Stone
- Zhiming Zhang
- Jins M. Melander
- Mohamed Al-Lawati
- Al Schott
- Felix G. Gantes
- Shari Moskow
- Jae Ryung Kweon
- Nils G. Larson

Peter Monk
- A.K. Ajji
- Sine Fjør
- Zohar Yosibash
Talks

discontinuous viscous compressible flows - B. Kellogg

Preconditioning Oseen's Approximations of the
Reissner-Mindlin plate model - R. I. Falk

Least-squares approach based on a discrete
minus one inner product for first
order systems - J. Pousada

Multigrid Uzawa Algorithm for divergence free mixed elements - Shangyou Zhang

Stability of the quadrilateral elements $9/(4c+1)$ and $9/8c$ for Stokes - Jinshui Qin

Error analysis of a set of Galerkin FEM for a set of coupled Helmholtz equations in one dimension - Frank Delaporta

Corner Problems - Grid refinement, relative error, superconvergence and extrapolation - Al. Schatz

Numerical experiments on Nonlinear Parametrized PDEs - Felix C. J. Jones
Compressible Navier-Stokes equations in a bounded domain with inflow boundary

Joe Hyung Kim

Gauss point mass lumping schemes for Maxwell's equations

Peter Monk

Convergence of Mann iteration processes for nonexpansive operators in metric spaces

Soren Jensen

Numerical Analysis of Thermo-Elastic problems

Z. Yosibash

Adaptive Finite Element Methods for Conservation laws

Nils G. Larson
October 3rd & 4th, 1995

The Fall 1995 Circus was held at the University of Maryland at Baltimore County (UMBC) in Oct. 13 and 14. The meeting was organized by Soren Jensen, Mervin Sue and Ron French. 

Information was disseminated via a broken information system for the first time. There were 49 attendees for the first time. We had an excellent dinner on Friday evening at the Warwick's Restaurant.

Circus Poem

Sung to a well-known Baltimore tune:

Oh say can you see
Thru a glass of bud-lite

at UMBC

Finite elementists in full fight.

General remarks continue:

Ivo announced his retirement as the Circus Ring Master. Doug Arnold and Bele Falks play this role in the future.
The Circus at UMBC
(by Don French and Todd Peterson)

The circus convened in Baltimore,
And Ivo announced that he'd be no more,
Our fearless leader thru thin and thick,
But he'd give that task to Doug and Rick.

After studying Shakespeare's early scrolls,
Our interest was lost to two black holes,
The Kacanov tag-team showed us their stuff,
And we saw several other problems, all very tough.

Ivo begged us to worry about engineer's money,
And told us the h-p's was, indeed, quite sunny.
He also reminded us of old problems that still remain,
Such as how to analyze approximations on the
L-shaped domain.

Søren Jensen was the host with the most,
As all the participants were happy to boast.

As the talks passed by we came to see,
That the fine tradition of the circus was continued at UMBC.

We now look forward to the Spring,
And the new ideas that the trip to South Carolina would bring.
Attendees

Donald O. Fred
Søren Jensen
Hag Water
Howard Elman
Mario Casarin
Todd E. Peterson
Alan Berger
UL Seidman
Leif J. Eric Bonnetier

Peter Monk
Zhimin Zhang
Dan Stefanica
Manel Surj
Brooke Stephens
Hwan-Ho Kim
Fei Wang
Shi J.
Ling Shen
Tinhui Qin
Shangyou Zhang
Jian Shen
Bruce Kellogg
Doug Arnold
Dan B. Wahlbin
John Olson
Steve Serbin
Doug Menle
Anup Mukherjee

J. Z. Zhu
D.A. French - DG for the Forward/Backward Heat Equation
S. Jensen - Is Kačanov method ever practical?
Alan Berger - Numerical Experiments Generating & Averaging for Self-affine Noise
L. Chilton - Computational Analysis of Finite Element Methods for Nearly Incompressible Linear Elasticity

Christos Xenophontos - Boundary layer Approximation by hp-FEM

Igor Shimanskly - A Posteriori Estimators for Kačanov method.

Peter Monk - Subgridding Finite Difference Time Domain Methods.

Zhiqiu Zhang - Some superconvergence results.

Jinshuai Qin - Locking free finite elements for Reissner-Mindlin plates.

Jian Shen - A Block Finite Difference Scheme for Second-Order Elliptic Problem with Discontinuous Coefficients.

Bruce Kellogg - n-widths for a singular perturbation problem.

Doug Arnold - Preconditioning in $H(div)$ with Applications to Mixed Methods.

Lars B. Wahlbin - A priori, a posteriori and adaptive stiffness in eigenvalue problems.

Olof Widlund - Domain Decomposition for Mortar Finite Element Methods.
Douglas B. Meade - Time-Harmonic Wave Propagation on Unbounded Domains
Eric Bonnelin - Structural shape optimization by homogenization
Arup Mukherjee - A finite element code for the Initial data problem for colliding black holes

Guangcao Ji
T. E. Peterson
I. Babuška

Continued Time Galerkin Methods for Parabolic Equations with Time Dependent Coefficients
p and h, p FEM in topology engineering problems

Howard Elman - Iterative Methods for the Discrete Navier-Stokes Equations

Mario Casarin - Diagonal edge reconditioners for the p-version and spectral element method.
University of South Carolina
April 19-20, 1996

Sue Brenner hosted the circus in Columbia, S. C. on a pleasant spring weekend. There were 49 attendees, and only 12 talks which produced a lengthy session. There was a dinner at the faculty club on the campus, while preparations for an outdoor concert of Hootie & the Blowfish were underway outside. Breakfast, lunch, & snacks were provided by the host.
Poem by R. Falk

We came to South Carolina
To a Circus hosted by Sue
She made sure the azaleas were in bloom
And got Hootie and the Blowfish to be there too

The talks proceeded at a leisurely pace
An unheard of thirty minutes was the each Speaker's due
It seems that all is well in the finite element world
Except for Ivo, who was home with the flu.

Thought of R. Falk

I was thinking about Ivo not being at the circus, and about Hootie and the Blowfish performing.

Growing up I used to watch Superman on TV and one continuing theme was that Superman and Clark Kent were never in the same place together. So it occurred to me that perhaps Ivo is one of the Blowfish? Nah!
Attendees

Doug Arnold
Vladimir Dubinin
Vladimir Temlyakov
Jinshe Qin
Steve Serbin
Ashlie Faer
Hae Soo Oh
Yiping Mao
Zhimin Zhang
Peter Mark
John Osborn
Susanne C. Brenner
Li-ying Sung
Bob Sharpless
Doug Meade
Lyth B. Clark, Jr.
Alex Antonov
M. Audrey
Mike Chernicky
Per-Gunnar Martinsson
Patrick Anderson
Brendan Lane
Chris Roscoe
Donald Adongo
Shihua B. Popev

Atherey Telyakovskiy
Michaela Conlee
Emel Conlee
Constantin Oskolkov
Coli Bean
Eugenia Petrova
Shushuang Nan
Wingni He
Ronald A. DeRose
Alexandre J. Madiantsev
Yuecheng Feng
Hong Wang
Bo Li
Shangyou Zhang
Lawrence Conzez
Ridgway Scott
Laure Garcia
Len B. Wallman
Tobin E. Peterson
Donald C. French
A.K. Aziz

(over)
Talks

Doug Arnold - Performance of a preconditioner for the Reissner-Mindlin plate

Vladimir Temlyakov - Universal Cubature Formulas

Jinshui Qin - Some iterative methods for solving saddle-point problems

Peter Monk - The perfectly matched layer

Doug Meade - A Nonoverlapping Domain Decomposition Method for the Helmholtz Equation

Ron DeVore - Linear and Non-Linear numerical methods for PDE's and its relation to regularity of the solution

Konstantin Osolkov - "Regularity" of solutions of Schrödinger equation of a free particle

Hong Wang - An ELLAM scheme for multi-dimensional advection-diffusion equations.

Bo Li - Finite Element Analysis of Microstructure of Martensitic Crystals (Joint work with M. Luskin)

Ridgway Scott - The Iterated Penalty Method with Inhomogeneous Boundary Conditions
Lars B. Wahlbin: La stability of the Finite Element Method in Parabolic Problems (joint with A. Schatz and V. Thomée).

University of Tennessee

October 18-19, 1996

Steve Serbin hosted the Fall 1996 Circus in Knoxville. After six talks on Friday, we had the circus dinner at O'Charley's restaurant. After four talks Saturday morning, we were treated to lunch in the "executive dining room." Five more talks ended the meeting. Despite having no email address, Ivo has now gone high tech. He urged circus members to look at the ticom web site at http://www.ticom.utexas.edu/ticom-timu.

E. Fack contributed the following poem:

Ivo's Lament

We used to determine the order of speakers by drawing numbers from a hat.
Now we use a laptop computer and random numbers to do that.

Someday, we may only have a virtual circus, connecting only by computer and phone.
I knew when I let those new guys run the circus, they would not leave well enough alone.
Attendees

Douglas N. Arnold
Vasile Alexiades
Pierre A. Gremaud

John Aronson

J. T. Ang
0. Kossakoski
Feng Wang
Je. I.

Susanne C. Brenner
Qingyi Deng
Xiaoting Feng

Alexander J. Bushell
Aly Mitchell

Robert S. Stair
J. Thomas King

Tadeusz Janik
Sven Jensen
Vadim Korobei
Jianhui Chen
Weihui Wang
Talks

Doug Arnold: Derivation and justification of plate models

Pierre Gremaud: Numerical experiments about Hamilton-Jacobi and the viscosity criterion.

Reza Barakat: Local convergence of the element method

Al. Shehaj: Some remarks on a posteriori estimates.

Chuck Collins: Convergence of a reduced integration method for computing microstructure

Feng Wang: A crosswind strip domain decomposition method for convection dominated problems.

O. Karakashian: Space-time Galerkin methods for the nonlinear Schrödinger equation

Joe I.: NEWeS. for Euler/Navier Stokes CFD Algorithms

Susanne Brenner: Multigrid Methods for Singular Solutions and Stress Intensity Factors

Xiaodong Feng: Transmission conditions & Non-overlapping Domain Decomposition Algorithms for the Finite Element Method

Soren Jensen, Vadim Konev: On domain decomposition preconditioning in the hierarchical p-version of the finite element method

Lorane Cauvir: Analysis of Schwerfuss-Zurnel Finite Volume Methods for Convection-Diffusion Equations
Da-Qing Wang: A Covolume Scheme for Electromagnetic Scattering in 3D.

Zhimin Zhang: Finite Element Superconvergence.

Steve Serbin: Some Remarks on Continuous Diagonally Implicit Runge-Kutta Methods

Prof Widlund: Overlapping Schwarz Methods for Mortar Finite Element Methods.
Courant Institute  
April 18-19, 1997

The Finite Element Circus paid its first visit to the Courant Institute. Olof Widlund did an excellent job as host, overcoming the substantial difficulties posed by having a circus in New York City. In fact, in order to describe the route to the restaurant and lodging, Olof was forced to use his entire 15 minute speaking time. Almost half the circus members failed the quiz on the N.Y.C. Subway System.

Dinner was arranged at the Oriental Garden restaurant in Chinatown. The schedule of the talks was 8 on Friday afternoon and 14 were on Saturday.

That is a Heck of a Mesh Generator
You Have There
by Rick Fatl

A circus in the Big Apple
I knew it was meant to be
when Olof showed his unstructured mesh
And it was a map of N.Y.C.
Attendees

Richard Faer
Douglas N. Arnold
Junhui An
Hae Soo Oh
Peha
Bruce Kellogg
Feng Wang
Hwanho Kim
Zhimin Zhang
Jie Shen
Li-yeng Sung
Dexuan Xie
Susanne C. Brenner
Sonia Gaines
Laurie Whitt
Padmanabhan Geshayker
Christos Xenophonos
Vadim Konev
Ragnar Winther
Alfred Schatz
Falkar Bornemann
Frank Elliott Jr.
Tom Lord
Jonathan Goodman
Dan Stefanescu
Tom Delillo
Lucio Pavarino
Andrea Toselli
Manil Duni
Ling Shen
Elena Mason
Anup Mukherjee
Alexandre Macedo
Ion Bica
Neda Khovanskaia
Juan Carlos Aguilmar
Bernhard Hentschel
Yin-Tzer Shih
Howard Elman
Barnabas Burres
Ralf Hiptmair
Peter Monk
Shanyou Shang
Marcus Grote
Ashish Gupta
Abani Patra
M. Bruce Davis
Olaf Willenborg
David Pikan

I. Babuška: A posteriori error estimates for boundary element problems (with M. Ainsworth)

Kellogg: Forward-backward parabolic equation (with A. Frief, E. Jensen)

Z. Zhang: Finite Element and Difference Methods for Some Stochastic PDEs.

C.L. Chang: Cleveland State Uni.

P-piecewise linear Approximation to the Stokes Problem with Velocity Boundary Condition.

Bengi Guo, Univ. of Manitoba: Direct and Inverse Theorems for the Perron of KEM Based on Weighted Besov spaces; Part II: In 3 dimensions.

Dexuan Xie & L. Ridgway Scott, Courant Institute and University of Houston: The Parallel U-cycle Method.

L. Chilton: Mixed hp elements for (nonlinear) elasticity.

P. Seshaiyer, University of Maryland Baltimore County: "Uniform LP estimates for partitioned domains".

V. Korneev: Something on $C^1$, $C^2$, curved finite elements.

A. Schatz and J. Wang: Aubin–Nitsche duality with $H^1$ regularity.

San Stefancic: Poincaré- and Friedrichs-Type Inequalities for the Mortar Finite Element Methods.

M. Sun: On the Spectrum of linearized buckling problems.

ION Bica: Domain Decomposition Methods for the P-Version Finite Element

Y. T. Shi: Efficient Streamline upwind schemes for Convection-Diffusion Problems.

H. Elman and D. O'Leary: Efficient solution of the Three-Dimensional Helmholtz Equation.

Frank Ihlenburg: Numerical analysis of exterior Helmholtz problems with finite and infinite elements.

Ralf Hiptmair (Univ. Augsburg): "Multigrid Method for Maxwell's equations".

Peter Monk: "Adaptive computations of far field Patterns".

Richard Falk: "Equilibrium Shape of Deformable Elastic Crystals".

Jonathan Goodman: "Anisotropic adaptive refinement".
The Circus Comes to Cornell (by Don French)

The time to discuss finite elements once again came around
The circus was in Ithaca where Fall colors could be found
Alas, many of the usual performers did not appear
But we still gave our talks and they were all perfectly clear.

The lectures were excellent as we all would attest
Bars vigorously chased that nasty logarithm pest
John Osborn explained how badly our method could perform
And from Xinzhao Xu a new multigrid algorithm was born

But the conference was quieter without Ivo to run the show
No clapping or yelling to keep us all in tow
His questioning and book-keeping were all part of the game
And he would not let us forget the L-shaped domain.

The Cornell circus will soon come to an end
We have now shown where all our approximate solutions will tend
So back to our homes we must now go
To refine more meshes before the next circus show
Cornell University
October 10-11, 1997

The circus was held during two magnificent fall days on the beautiful Cornell campus. Only 15 people spoke, and so we were allocated a generous 30 minutes each. In the absence of Rick Falk, two new poets tried their hand. On Friday evening we enjoyed a lovely buffet dinner at the home of Lars and Anita Wahlbin.
In the land of magic and mythica,
Laid I mine eyes on the maiden of Ithaca.
I followed her to where she did dwell
In the shimmering kingdom they call Connell.

A posteriori estimates at her feet did I lay,
Logarithms for her love I did slay.
Domains I decomposed, to amuse her
Secrets of superconvergence did I pursue her.

I hoped to win her over this way,
But my heart sank when she did say:
"Finite elements do nothing for me,
I care not a whit for h/p —

If my hand 'tis your wish to secure,
Try not to be such a bore.
There's one big mistake you're making, pal—
This lady's a finite difference kinda gal!"
Attendees

Douglas N. Arnold
Jurek Ask
Dan B. Wilkes
Alfred H. Schatz
J. Thomas Battle
Houde Han

Peter Monk
Joseph Coyle
Nilima Nigam
Shangyou Zhang
Zhimin Zhang
Sheng Zhang

Andrei Wad
Ludmil Zikatanov
Hwanho Kim
Donald A. French
Bill Hager
Uday Banerjee

Ian Bica
Varis Carey
Dorothy Ledem
Edris S. Titi
Matt Miles
Talks

Jinchao Xu: EAFE Scheme for Convection-diffusion problems and application to conservation laws

Lars B. Wahlbin: Stability, analyticity and almost best approximation in maximum-norm for parabolic finite element equations.

All Schatz: Some remarks on a posteriori estimates for second order elliptic problems.

Houde Han: A new mixed finite element formulation and the MAC scheme for Stokes equations.

Ricardo H. Nochetto: Optimal a posteriori error estimates for variable time-step discretizations of evolutions inequalities

Jan Sobotica (w/ Axel Klawonn): Mortar Finite Elements for the FETI Method

John Cason: Can a Finite Element Method Perform Arbitrarily Well?


Ion Bica: Iterative substructuring methods for the divergence finite element

Barbara Wohlmuth: Helmholtz type decompositions as a construction tool for error estimators and iterative solvers
Edriss S. Titi: Postprocessing Galerkin Method: A Novel Use of Approximate Inertial Manifolds

Zhimin Zhang: FE superconvergence for a singularly perturbed problem.

Donald French: Pointwise A Posteriori Error Estimator for the Obstacle Problem

Petr Oswald: Multilevel solvers for H⁻¹ problems: piecewise constant approximation

Bill Hager: Euler discretization in optimal control
University of Colorado at Denver
March 27-28, 1998

Leo Franca hosted the first circus held in Denver. After eight talks on Friday, circus members had an excellent dinner at Al Fresco restaurant. Also for the first time, circus members were supplied with nametags. After going to the circus for over 25 years, this enabled me to finally find out which one was too Babușka—he was the person not wearing a nametag.

Rocky Mountain Circus High
by R. Faeh

It was the first circus ever in Denver
And Leo put on quite a show,
His website had all the info,
And the signs told you where to go.

He got the sun to shine on the Rockies
And the snacks were the best and the most.
If Leo would only reimburse my airfare,
I'd make him permanent circus host.
Attendees

Rick Falk
Douglas N. Arnold
Alan Williams
Kyrur D. Mish
Rossen Parashkerov
Bruce Wade
Hae-Soo Oh
John Adams
Ali Nesliturk
Jabila
Marcus Sarkis
Susanne Brenner
Zlatko DRMAC
Leopoldo Franca
David Duran
Tom Russell
A. Souliai
Faud Seghir
Peter M. L.
Shagd-Shih
Pay Gopalakrishnan
Tong Sun
Pandy Chee
Feag Wang
Bigne Liu
Colin J. Aro, LLNL
Li Wu
Zhimin Zhang
Shangyou Zhang
Joe Pasquale
Mihal Holst
Marian Frey
J. Mander
Talks

Douglas N. Arnold: Tetrahedra Bisection

Kyung J. Kim: A Finite-Element Solver Interface Specification

Rosen Parashkevov: Flux Error Estimate for Mixed FEM

Bruce Wade: The Weighted Continuous Galerkin Method for Evolution Problems

Ibrahim D. Gao: New results on the p-version of FEM related to the war against ε

Susanna Brenner: Lower bounds for two-level additive Schwarz preconditioners with small overlap

Hae-Soo Oh: The p-Version of the Finite Element Method for steady Incompressible Flows over Domains with Corners.

Feng Sun: Long-time error estimate & stability indicator

Zhiqiang Cai: First-Order system least squares for linear elasticity

Feng Wang: Multigrid preconditioner for the Chebyshev Collocation method.

Bingjie Liu: A finite element method with streamline diffusion for compressible Navier-Stokes equations

Zhiming Zhang: Finite element superconvergent recovery for the intermediate family of the second type

Jin-Liang Liu: A Unified A Posteriori Error Estimation for FEM, FVM, and BEM.

Joe Pasciak: Computational scales of Sobolev norms with application to Preconditioning
Michael Holst: MC: A multilevel finite element code for nonlinear forms on 2- and 3-manifolds

Andrew Knyazev & Elof Widlund: FEM error estimates for elliptic problems with rough coefficients.

V. Druskin & L. Knizhnerman: How to make the three-point scheme exponential convergent.

Jan Mandel: Domain decomposition for plates by Lagrange multiplier.

Patrick O'Leary: Shagi-Di Shih: Internal layers of singularly perturbed problems.
University of Maryland
November 6-7, 1998

The Finite Element Circus returned to the University of Maryland for the Fall, 1998. After ten talks on Friday, we had an excellent dinner at the Calvert House restaurant followed by a party hosted by Ricardo Nochetto. Saturday, we had a record 16 additional talks.

Inspired by the proximity to the nation’s capital, R. Falk designed the following:

TEST TO DISTINGUISH BETWEEN Members of the F.E. Circus Members of Congress

Identify the following shapes:

1. [Square]
2. [Left angle]
3. [Complex shape]

Typical responses on following page.
1. Rectangular finite element highlighting boundary degrees of freedom

2. Bad choice for the shape of a quadrilateral element

3. A difficult domain on which to compute a finite element solution

Diagram of office complex surrounding the oval office as shown in the Starr report

Member of Congress

Fund raiser seating chart highlighting seats of large donors

Good choice for the shape of my congressional district after the next census
Attendees

Amir Fakhr
Marcus Sarkis
Jinchao Xu
David Sil implicit
Ricardo H. Nochetto
Jan Chleboun

Douglas Arnold
Rognedda Khovanskaya

Di Hung
Karen Camarota
Stein Uvrigt
A.K. Aziz

Zhimin Zhang
B. Kellogg
Aihui Zhou

Benzang Mireksa
Dan Stefanica
Panu Mufar

Jung-Han Kim
Omar Lakakis

Varis Corey
G. F. Cao
Al. Schatz

Shangyou Zhang

Uday Banerji
Saiint Dey
Joseph Shirron

Xiaohai Liao
Kittisak Chayamontsak

Peter Oswald
Tobias von Petersdorff

Daniele Botti
Alexandre Madureira
Amp Muthiah
Hwanho Kim

Susanne Brenner
Manil Duri

Christos Xenophon
Sonia da Riva

Bo Li
Hae-Soo Oh

Tad E. Peterson
Dan B. Whitten
Dakla Salt}

Sungjin Lee
Hoonjoo Kim

Pramanay Th
Talks

Rick Falk: New locking free finite element for the Reissner–Mindlin plate

Marcus Sarkis: Discretizations on overlapping non-matching grids

Jinchao Xu: Some local/parallel methods for elliptic problems

David Schachter: Factorizable schemes for the equations of fluid flow

Ricardo H. Nochetto: Positivity preserving finite element interpolation and applications

Jan Chleboun: On a problem with uncertain input data: Quasilinear steady heat flow equation

OF MONO: Hierarchic substructuring methods for vector field finite element discretizations

Bo Li: Finite element modeling of microstructure near an interface between twinned layers and homogeneous state

Lars B. Wahlbin: Asymptotically exact a posteriori error estimators for the gradient on each element in non-uniform meshes (with Hoffmann, Schatz, Vittum)

Matthias K. Gobbert: A survey of finite elements for the computation of crystalline microstructure

Daniel Boff: A penalty method for Maxwell eige.

Hwanho Kim: Some multi-level methods for non-SPD and/or indefinite elliptic systems

Christos Xenophontos: Application of the p-version FEM in elasto-plasticity with localization of deformation

Gautam T. Cay: Progress & Open Questions on Least Square Finite Elements (with A. Pellegrino, F. Böck)
Attendee
Druskin
John Osborn
Howard Elman

S. Asvadurov "How to make a three-point scheme exponentially convergent, Part II: Applications to Elasticity." (with V. Druskin and L. Kritzman).

P. Oswald: A scheme for deriving discrete harmonic extension operators within the additive Schwartz method.

Doug Arnold: Multigrid in H(div) and H(curl).

L. Zikatanov: "A multigrid method using graph level sets".

Al. Schatz: Some improved pointwise estimates for differences are discussed.
Dexuan Xie: Symmetric PSOR as an Efficient Parallel Preconditioner

Xuejun Zhang: Least-squares finite element method for div-curl system

M. Grillakis: U.M.C.P.

B. Kellogg: Best approximation (n-width) for 1 dimensional Helmholtz

Tong Sun: Object-oriented Programming for general mixed finite element methods

D. Skjärving: Numerical Results for the FETI Method (w/ Axel Klawonn) with Moder Finite Elements

M. Aissa: (Bena Slimane): A new hierarchical basis for triangular and tetrahedra

J. G. Liu: A simple finite element method for incompressible flow

Harland Glaz: U.M.C.P.
Penn State University  
April 16-17, 1999

Talks

Ivan Yotov "Domain decompositions for multiphase porous media flow on multiblock domains"

Anastasios Liaros "Weak Imposition of Boundary Conditions to the Stokes Problem"

Michael Holst "Using Local Estimates to Decouple Adaptive Finite Element Methods"

Feng Wang "Adaptive Multigrid Method for the Poisson-Boltzmann Equation"

Jian-Guo Liu, Discontinuous Galerkin method for 2D incompressible flow

Bruce Kellogg INFEM - a method for singularly perturbed convection-diffusion

Daniel Boffi Discrete compactness property for edge elements

Alexandre Madureira Error estimates for hierarchical modeling using asymptotic expansions

Timothy Barth A Posteriori Error Estimation and Adaptive Methods for Stabilized FEM Approximations of Hyperbolic Problems
L. Zikatanov: Norms of projections in Hilbert Space.
M. Suri: Numerical Analysis of Buckling in Thin Plates.
V. Carey: Locally Constrained Projections.
Zhipei Li: On the Computation of Crystalline Microstructure.
Jinchao Xu: Some applications of partition-of-unity finite element method.
Hendrik G. Jilek: Adaptive finite elements for phase transition problems with convection.
Lars B. Wahlbin: Positive finite element approximation (with R. Nochetto).
Ricardo H. Nochetto: Error Control for the Continuous Casting Problem (W. Z. Chen and A. Schmidt).
Pedro Morin: Do Adaptive Algorithms Converge?
Monique Dauge: Maxwell equations and non-convex corners: The eventualty of a numerical catastrophe.
Zhimin Zhang: Local recovery properties of SPR for rectangular elements.
Attendees

Derek Fava
Douglas N. Arnold
Ivan Yotov
Zhimin Zhang
Traian Iliescu
Anastasios Liacos
Michael Holst
Feng Wang
Jiah-Guo Lin
Bruce Kellogg
Mohammed AIFFA
Nicolae Tarafulea
Daniele Botti
ALEXANDRE MADUREIRA
Anup Mukherjee
Timothy Barth
Ludmil Zikatanov
Manil Suri
Nik Roschl
Alan Demlow
Vai Carey
Shihe Zhou
Peter Monk
Pet L. Pechatz
Wong Ming
L. Zhigang

Jinchao Xu
Ping Lee
Shangyou Zhang
H. Uyriicer
Benibo Yang
Huy N. Dinh
Ragneda Khotanskaya
Louis B. Wright
Ricardo H. Nochetto
Pedro Morin
Hakanho Kim
Bojan Petrovic
Monique Dauge
Jinhae Park
Noël Heittmann
Atife Caglar
Bringing Back the Good Old Days
we got the order of speakers at the
first circus
by drawing numbers from a hat.
In recent time we've gone high tech
using a random number generator to do that.
Some complained, so Doug's computer
now makes the sounds of days gone by.
If he can make it look like Mary Wheeler
we old-timers may start to cry.

E. Force

* Author's background note:
  In the early circuses, Mary was
called by Ivo to draw the number.
** This poem provides an updated ending
to the poem of Oct. 1996.
The Spring 1999 circus was held at the Hotel Atherton near the campus of Penn State University. After nine talks on Friday afternoon, a buffet dinner was held at the hotel, followed by a party at Doug Arnold's house. Twelve more talks on Saturday brought circus members up to date on the latest developments in the field. Presumably, Joe Paterno was out recruiting, so was unable to attend the circus. Although there were many X's and Y's at the circus, we missed Joe's unique combination of X's and O's.
Talks
Douglas Arnold: Approximation by quadrilateral finite elements
Abani Pabrai

Tong Sun: Mass Conservation & Long-time error estimation

Ramesh Parasharh: Maximum Norm Estimates for Stokes equations on Translation Invariant Meshes

Christos Xenophontos: On the construction of optimal meshes for the FEM for singularly perturbed problems.

Matthias Gobbert: A Homogenization Technique for the Boltzmann Equation for Chemical Vapor Deposition

Peter Oswald: On multilevel bases for divergence-free finite elements

Min Chen: 4-dimensional dynamical systems

Alan Demlow: A priori Weighted Max Norm Estimates for a Mixed method
Talks, contd.

Al. Schatz  Asymptotic error expansions.

Lars Wahlbin  Positive finite element approximation.

Hongbin Qin  Multigrid methods for harmonic map computation. "Dureas."

Graham Carey  Elements under "Dureas."

Pedro Morin  Data Oscillation and Convergence of Adaptive FEM for Elliptic PDE
Attendees

Douglas Arnold
Andrew Bauer
Tony Sun
Susanne C. Brunner
John Osborne
Uday Banerjea
Rein Ramacher
Christos Xenophontos
Pavlos Grobert
Biswarup Dewan
Shangyan Zhang
Min Chen
Varis Carey
S. T. Gray
P. Fleckard
Peter Monk
Dmitriy Lysenko
Jie Shen
Zhimin Zhang
Sonia Garcia
Nicole Tsui
Sheng Zhang

Abay Duncun
Mohammed Al-Iffaa
Hwanbo Kim
Ludmil Zikatanov
Joelvo Xu
Law B. Wahlin
Bik Faer
Pedro Morin
The last circus of this century was held on the Cornell Campus at Mallott Hall, the new home of the Mathematics Department. After 6 talks on Friday, circus members were invited to the home of Lars and Anita Wahlbin for a wonderful buffet dinner. Following 6 talks on Saturday morning, circus members were treated to a buffet lunch at the Statler Hotel. Four more talks then closed out the Fall Circus on a beautiful Ithaca weekend.

Lars Wahlbin contributed the following poem for the enjoyment of circus members:
Next Thousand Years.

The Millenium closes,
And so will this Circus;
Are Foundations done Right for the
next thousand years?

Is reasoning Bright,
Are arguments Tight,
Will they Live in the next
thousand years?

When Work sheds Light,
And is Bright and is Right,
It SHINES, through the next
thousand years.