University of Wyoming
Rocky Mountain Mathematics Consortium
Summer Conference

Dynamic equations on time scales
and
their applications

July 8–July 19, 2002

Speakers:

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Two presentations (each 75 minutes) will be given each morning by the lecturers. Informal discussions, problem solving sessions, and contributed talks will be scheduled for the afternoon. There will be no afternoon talks either Friday, July 12 or Friday, July 19.

The study of dynamic equations on time scales, which has recently received a lot of attention, was introduced by Stefan Hilger in his PhD thesis in 1988 (supervised by Bernd Aulbach) in order to unify continuous and discrete analysis. A time scale is just a closed subset of the real numbers. When the time scale is the set of real numbers the dynamic equation is a differential equation and when the time scale is the set of integers the dynamic equation is a difference equation. These lectures will be an introduction to the study of dynamic equations on time scales. We will only assume that the participants have had a first course in differential equations and a first course in linear algebra. We will systematically go though the book of Bohner and Peterson which is listed below. During the second week of the lectures we will discuss some of the latest developments in this area of research and discuss open problems. Anyone interested in differential equations or difference equations will be interested in attending these lectures.

There are numerous applications of dynamic equations on time scales in biology, engineering, economics, physics, neural networks, social sciences, and so on. For example, a dynamic equation where the time scale consists of disjoint closed intervals can model insect populations that are continuous while in season, die out in (say) winter, while their eggs are incubating or dormant, and then hatch in a new season, giving rise to a nonoverlapping population. Another example of this type is an electric RLC circuit where the capacitor is periodically discharged. Several time scales are very important for numerically approximating solutions of differential equations. The so called q-difference equations are important in the asymptotic behavior of solutions. Many examples will be given during these lectures.

Prerequisites:

1. A first year course in differential equations.
2. A first year course in linear algebra.

Text:
Martin Bohner and Allan Peterson, *Dynamic Equations on Time Scales: An Introduction With Applications*, Birkhauser, Boston, 2001. The book normally costs about $55 and you will get a 20% discount if you purchase this book at the conference. Please indicate your desire to purchase the book when registering for the conference.

Course Outline:

1. The time scales calculus.
2. The generalized exponential and trigonometric functions.
3. Second order linear dynamic equations.
4. Self-adjoint dynamic equations.
5. Linear systems of dynamic equations.
6. Dynamic inequalities.
7. Linear symplectic dynamic systems.
8. Generalizations to dynamic equations on measure chains.

Room and Board Stipends
A limited number of stipends to cover the cost of room and board are available. These will be issued on a competitive basis and will be divided among both faculty and graduate students. Participants who wish to pay their own room and board will be accepted as long as space is available. Double rooms and board are $375 per person, and a single room and board is $450. Participants who do not wish to apply for funding should indicate this in writing. In addition, both e-mail and regular addresses should be included.

Faculty Applications
Each faculty applicant seeking funding should submit a vita and a letter describing his or her professional aspirations and what he or she hopes to accomplish by participation in this conference. A letter of recommendation from the applicant's department chairperson should should be sent by hard copy or e-mail. Faculty not seeking funding should fill out the housing application and indicate that no funds are requested. All these forms can be done either by hard copy or electronically at the conference web-site http://math.uwyo.edu.

Graduate Students Applications
Graduate students should apply following the instructions on the application Form. A letter from a major professor or department chairperson is required.

Deadlines
The deadline for application is April 1, 2002. Applications received after this date will be considered as long as space and funds are available. Applications processed after May 28, 2002 may be assessed a $50.00 late fee. For further information please contact:

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or check out the conference web page at http://math.uwyo.edu.

Housing Application and Registration Form
UW/RMMC
2002 Summer Conference
Dynamic equations on time scales and their applications

NAME: _____

MAILING ADDRESS: _____

_____

E-MAIL ADDRESS: _____

GRADUATE STUDENT _____ FACULTY _____

PLEASE CONSIDER ME FOR A ROOM AND BOARD STIPEND _____

I WILL PAY MY OWN ROOM AND BOARD _____

I WOULD LIKE A DOUBLE ROOM ($375 EACH) _____. PLEASE ASSIGN _____ AS A ROOMMATE.

I WOULD LIKE A SINGLE ROOM ($450) _____

I WANT TO PURCHASE THE BOOK *Dynamic Equations on Time Scales: An Introduction With Applications* _____

Faculty seeking funding should submit a vita and a letter describing his or her professional aspirations and what he or she hopes to accomplish by participation in this conference. A letter of recommendation from the applicant's department chairperson should should be sent by hard copy or e-mail.

Graduate students should arrange for a letter from a major professor or department chairperson to be sent, and should answer each of the following:

1. Are you currently working toward a Ph.D?
   In what area? _____
   Who is your major professor? _____

2. Do you need to receive class credit for attending this course?
   If "yes", do you plan to accomplish this by:
   (a) _____ Registering for an independent study course at your own university with a grade to be assigned by your major professor, or
   (b) _____ Registering for the course at the University of Wyoming and then transferring credit to your own university. (Tuition information is available on request.)

3. Do you need financial assistance to attend this course? _____(Financial aid is limited. It will consist of meals and dormitory accommodations on a double-occupancy basis and will be available for graduate students from RMMC-member schools and for a limited number of graduate students from non-RMMC member schools.)

Applications to attend the Summer School should be received by April 1, 2002. Persons requesting financial aid should apply as soon as possible. After this date, scholarships will be awarded as long as space and funds are available.

Please return this form, or register electronically at htpp//math.uwyo.edu, by April 1, 2002 to:

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