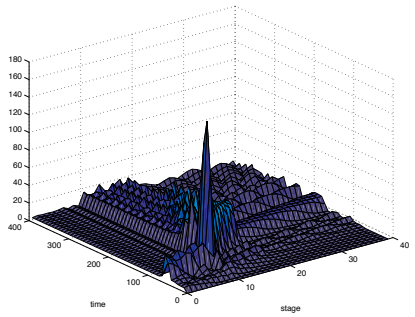
APM 526 SPRING 2020
NUMERICAL METHODS FOR HYPERBOLIC AND PARABOLIC PARTIAL DIFFERENTIAL EQUATIONS



- INSTRUCTOR: C. Ringhofer
- TIME: T,Th 09:00 AM - 10:15 PM, Tempe WXLR A111
- LINE Nr. 29346

COURSE DESCRIPTION:

This course will give an overview over numerical techniques for partial differential equations of evolution type (i.e. hyperbolic wave propagation problems and parabolic diffusion equations) occurring in fluid dynamics, electro dynamics, biology, traffic flow, and various areas of mathematical physics. After introducing the basic concepts of numerical methods for such problems, such as stability, consistency, CFL - conditions, artificial dispersion and diffusion, propagation of discontinuities (shocks) and weak solutions, we will focus on methods for equations with a wide range of applications. Equations considered will include the Euler equations, compressible Navier - Stokes equations and hydrodynamic models for traffic flow, population dynamics and biological systems. Methods covered will include flux limiter techniques, flux splitting methods, shock fitting and finite volume methods. Particular emphasis will be given to particle based and random methods such as Monte - Carlo techniques.
For more information go to https://math.la.asu.edu/∼chris/courses.htm
(On some older PDF readers the web address might have to be retyped by hand and not just copied!)

- HOMEWORK etc: Lectures will be in an in - class format. Homework will consist of 4-5 projects distributed over the course of the semester.
- PREREQUISITES:
- TEXTBOOK:
  - The course will rely mainly on classroom notes published online.
  - For some of the mathematical foundations we will use:
    Numerical Methods for Conservation Laws, ISBN: 9783764327231, Author: Randall J. LeVeque, Publisher: Springer-Verlag New York, Incorporated, Format: Paperback