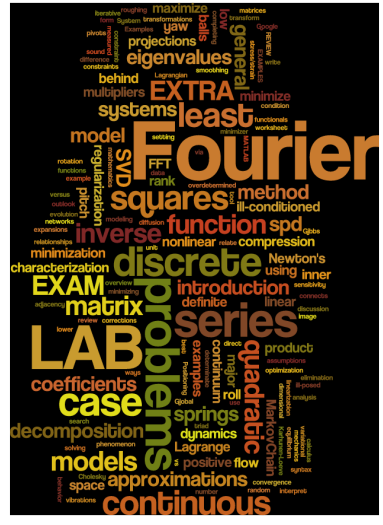
MTH 420/520 (Spring 2016)

Models and Methods of Applied Mathematics

www.math.oregonstate.edu/~mpesz/420-520_S16

MWF 2:00-3:00pm, Instructor: M. PESZYNSKA

Class content:



- Models and methods: *discrete and continuous models; linear analysis, equilibrium and minimum principles; calculus of variations; principal component analysis (singular value decomposition); orthogonal expansions; continuous and discrete Fourier analysis; least squares; constrained and unconstrained optimization; inverse problems.*
- Guided projects and activities: (do not require prior computing expertise)

  (As time permits)

  - *applications of Fourier techniques: music, touch-tone dialing, bar-code reading,*
  - *image reconstruction and deblurring, data clustering, web search engines and recommender systems,*
  - *introduction to machine learning: eigenFACES, pattern recognition*
  - *linear and quadratic programming,*
  - *Kalman filter and GPS, inverse problems,*
  - *introduction to Monte Carlo techniques.*

PREREQUISITES: MTH 256 and MTH 341 and junior status
TEXT: Gilbert Strang *"Introduction to Applied Mathematics"*, Wellesley, 1986