Math-360 Fall 2008

Prof. Anders Linnér

Office: Watson 363 **Office hours: W 10-10:50, Th,F: 1-1:50**

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Final Exam: Friday December 11, 8-9:50 a.m.

WEEK 1

Mon. 8/24 Examples of models and modeling issues

Wed. 8/26

Fri. 8/28 Railroad model

WEEK 2

Mon. 8/31

Wed. 9/2 Proportionality

Fri. 9/4 Hw 1 due

WEEK 3

Mon. 9/7 no class (Labor Day)

Wed. 9/9 Steven Annex Lab, Room 121

Fri. 9/11 Hw 2 due

WEEK 4

Mon. 9/14 Geometric similarity

Wed. 9/16

Fri. 9/18 Hw 3 due

WEEK 5

Mon. 9/21 Model fitting

Wed. 9/23

Fri. 9/25

WEEK 6

Mon. 9/28 Hw 4 due

Wed. 9/30 Optimization

Fri. 10/2

WEEK 7

Mon. 10/5

Wed. 10/7

Fri. 10/9 Hw 5 due

WEEK 8

Mon. 10/12 Dimensional Analysis

Wed. 10/14

Fri. 10/16

WEEK 9

Mon. 10/19

Wed. 10/21 Hw 6 due

Fri. 10/23

WEEK 10

Mon. 10/26 Population growth

Wed. 10/28

Fri. 10/30

WEEK 11

Mon. 11/2 Hw 7 due

Wed. 11/4

Fri. 11/6

WEEK 12

Mon. 11/9 Numerical solutions

Wed. 11/11

Fri. 11/13

WEEK 13

Mon. 11/16 Hw 8 due

Wed. 11/18 Differential equations

Fri. 11/20

WEEK 14	WEEK 15
Mon. 11/23	Mon. 11/30
Wed. 11/25 no class (Thanksgiving break)	Wed. 12/2 Hw 9 due
Fri. 11/27 no class (Thanksgiving break)	Fri. 12/4

Each homework is worth 20 points.

Hw 1. Sample Project (due Sep 4):

1. A train line has repair depots at points which are 1, 10, and 18 miles from the west end of the train line. Where should the parts warehouse be located if all three depots are to be visited equally often? Where should it be located if the 18 mile depot is to be stocked three times as frequently as the other two?
2. A train line has repair stations at locations 2, 4, 6, 8, and 10 miles. Initially, the number of times each must be restocked (per year) is 1, 2, 3, 4, and 5 times, respectively. However, a time goes by, the first station begins to require more and more visits. At what level of activity does the optimal location move westward? At what level does it become most practical to have the warehouse right at the first station?

Hw 2. Proportionality (due Sep 11):

3,4,6,13 Section **2.2**

Hw 3. Geometric Similarity (due Sep 18):

2-5 Section **2.3**

Hw 4. Model Fitting (due Sep 28):

Consider the data set $\{(0,0),(1,3),(2,5)\}$. No straight line passes through all points. Let the function classes be $F = \{f : f(x) = mx, m \in \mathbb{R}\}$ and $G = \{g : g(x) = mx + b, m,b \in \mathbb{R}\}$.

1. Determine the best fit in F for each criterion: Chebyshev, Minimizing Sum of Absolute Deviations, Least-Squares.
2. Determine the best fit in G for each criterion: Chebyshev, Minimizing Sum of Absolute Deviations, Least-Squares.

Hw 5. Optimization (due Oct 19):

1-6,13 Section **7.2**

Hw 6. Dimensional Analysis (due Oct 21):

2-5 Section **9.2**

Hw 7. Population Growth ~ Drug Dosage (due Nov 2):

2,6 Section **11.1**

Hw 8. Numerical Solutions (due Nov 16):

1-4 Section **11.5**

Hw 9. Competitive Hunters ~ Predator-Prey (due Dec 2):

5 Section **12.2**

5 Section **12.3**