

MATH 7695-8695: Bootstrap and Other Resampling Methods  
Spring, 2021

Tu, Th 2:40pm-4:05pm

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Zoom Meeting ID: 333 162 7149

Passcode: 66088657

## Course Contents:

1. Overview of Bootstrap Methods
2. Resampling Methods: Jackknife, Delta Method, Cross-Validation, and Subsampling
3. The Bootstrap and the R Language System
4. Basic Bootstraps
5. Bootstrap variants: Bayesian bootstrap, smoothed bootstrap, parametric bootstrap, double bootstrap,  $m$ -out-of- $n$  bootstrap, wild bootstrap
6. Bootstrap methods for linear regression models
7. Bootstrap methods for complicated models (censored, missing data, time series...)
8. Confidence Intervals Construction using Bootstrap methods
9. Hypothesis testing using Bootstrap methods
10. Semiparametric Likelihood Inference

## Textbook Used:

**Textbook used:** “*An Introduction To Bootstrap Methods With Applications To R*”, by Michael R. Chernick and Robert A. LaBudde (2011) ISBN 978-0-470-46704-6 Published by John Wiley & Sons, Inc.,

**Recommended book:** “*Bootstrap Methods and Their Application*”, by A. C. Davison and D. V. Hinkley, Publisher: Cambridge University Press, Hardback ISBN 0-521-57391-2, Paperback ISBN 0-521-57471-4.

## Software Used:

The use of R is required for this course. Additional software recommended: MAPLE.

R is a freely available language and environment for statistical computing and graphics which provides a wide variety of statistical and graphical techniques: linear and nonlinear modeling, statistical tests, time series analysis, classification, clustering, (in this class, bootstrap method) etc. R can be downloaded at <http://CRAN.R-project.org>

For a list of available packages, please see <http://CRAN.R-project.org/web/packages/>

## Office Hours:

By appointment via email: [lih deng@memphis.edu](mailto:lih deng@memphis.edu). My zoom ID information: Meeting ID: 333 162 7149, Passcode: 66088657

## Grading:

Assignments	30%
Midterm Project	20%
Class Participation	15%
Final Project	35%

## Class Schedule/ Expectations:

This class is being offered as a Remote Course for the beginning of the semester, lectures will be held over Zoom during scheduled class time. The time and URL for each Zoom meeting will be communicated in advance via email and it will be posted in eCourseware. We expect that Zoom lectures will be recorded and posted in eCourseware. Given that we have a small class size, we can be flexible on the lecture format for the remaining of the semester. Unless there is a significant improvement on the COVID-19 situation, it is likely that we will continue with the Zoom meeting. If we have a in-person class, you must wear a mask to enter the room. Attendance will not be counted toward final grade. Please take time to go to the following page and read what the administration and faculty believe to be important considerations for you, as a student, to consider regarding the COVID-19 virus.

<https://www.memphis.edu/msci/news/covid.php>