Abstract: "Regression diagnostics" are methods for determining whether a regression model fit to data adequately represents the data. This workshop will present diagnostics for linear models fit by least squares, for generalized-linear models fit by maximum likelihood, for linear and generalized-linear mixed-effects models, and for linear regression models estimated by instrumental variables.

The topics below don’t precisely correspond to the eight hours of the workshop; in particular, the earlier topics will likely take more time than the later ones.

1) Introduction and review of the normal linear model
2) Examining and transforming regression data
3) Unusual data: outliers, leverage, and influence
4) The response: Non-normality and nonconstant error variance
5) Lack-of-fit: Detecting and correcting nonlinearity
6) Diagnostics for generalized linear models
7) Diagnostics for mixed-effects models and instrumental-variables estimation
8) Collinearity diagnostics and wrap-up

Although they will be quickly reviewed, primarily to establish notation and basic results, I assume some familiarity with the various regression models covered in the workshop. Primarily to establish notation and basic results, I prepared a brief review of these topics; please read the review prior to the workshop.

I’ll use the R statistical computing environment for the presentation, and so I also assume some familiarity with R; you’ll find introductory material on R along with a variety of references and links to resources at http://tinyurl.com/ICPSR-R-course.


Materials for the workshop will be available in advance at https://tinyurl.com/SORA-TABA-diagnostics.

Speaker Bio: John Fox is Professor Emeritus of Sociology at McMaster University in Hamilton, Ontario, Canada, where he was previously the Senator William McMaster Professor of Social Statistics. Professor Fox received a PhD in Sociology from the University of Michigan in 1972. He is the author of many articles and books on statistics, including, recently, Applied Regression Analysis and Generalized Linear Models, Third Edition (Sage, 2016), Using the R Commander: A Point-and-Click Interface for R (Chapman & Hall, 2018), Regression Diagnostics, Second Edition (Sage, 2019), A Mathematical Primer for Social Statistics, Second Edition (Sage, 2021), and, with Sanford Weisberg, An R Companion to Applied Regression, Third Edition (Sage, 2019). He continues to work on the development of statistical methods and their implementation in software. Professor Fox is an elected member of the R Foundation for Statistical Computing and an associate editor of the Journal of Statistical Software.

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