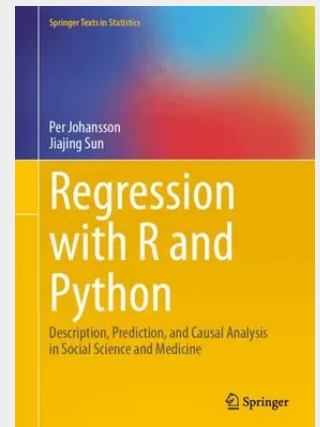


Regression with R and Python

Description, Prediction, and Causal Analysis in Social Science and Medicine

Regression with R and Python is a modern applied textbook on regression analysis that integrates theory, interpretation, and hands-on implementation in both R and Python. The guiding principle is that the meaning of a regression coefficient depends on the goal of the analysis—descriptive, predictive, or causal—so the book emphasizes interpretation first and clarifies which assumptions are needed, for which conclusions. The core chapters build from covariation and simple linear regression to multiple regression, functional form, and inference under clustered and panel-type dependence. The book then covers binary dependent variables and maximum likelihood estimation, modern prediction workflows (train/test splits, cross-validation, regularization, and tree-based methods), nonparametric regression, time-series regression and forecasting, and causal inference designs (experiments and key quasi-experiments such as difference-in-differences, instrumental variables, and regression discontinuity). A dedicated appendix develops robust inference for correlated error terms, including HAC/Newey-West, fixed-b, and self-normalization methods. Details on inference with nonparametric regression are developed in a separate appendix. Two programming appendices provide a self-contained introduction to R and Python and mirror the workflow used in the chapters. Additional appendices collect mathematical tools and give matrix-based technical presentations of OLS, GLS, and IV/2SLS. This book is intended for advanced undergraduate and early graduate students in statistics, econometrics, data science, and applied social sciences. Prerequisites are an introductory statistics course and basic calculus and algebra. Basic programming experience is helpful but not required.

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