Discrete Choice Methods with Simulation

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University of California, Berkeley
and
National Economic Research Associates, Inc.

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To
Daniel McFadden
and
in memory of
Kenneth Train, Sr.

Discrete Choice Methods with Simulation

This book describes the new generation of discrete choice methods, focusing on the many advances that are made possible by simulation. Researchers use these statistical methods to examine the choices that consumers, households, firms, and other agents make. Each of the major models is covered: logit, generalized extreme value (including nested and cross-nested logits), probit, and mixed logit, plus a variety of specifications that build on these basics. Simulation-assisted estimation procedures are investigated and compared, including maximum simulated likelihood, the method of simulated moments, and the method of simulated scores. Procedures for drawing from densities are described, including variance reduction techniques such as antithetics and Halton draws. Recent advances in Bayesian procedures are explored, including the use of the Metropolis–Hastings algorithm and its variant Gibbs sampling. No other book incorporates all these topics, which have risen in the past 20 years. The procedures are applicable in many fields, including energy, transportation, environmental studies, health, labor, and marketing.

Professor Kenneth E. Train teaches econometrics, regulation, and industrial organization at the University of California, Berkeley. He also serves as Vice President of National Economic Research Associates (NERA), Inc. in San Francisco, California. The author of *Optimal Regulation: The Economic Theory of Natural Monopoly* (1991) and *Qualitative Choice Analysis* (1986), Dr. Train has written more than 50 articles on economic theory and regulation. He chaired the Center for Regulatory Policy at the University of California, Berkeley, from 1993 to 2000 and has testified as an expert witness in regulatory proceedings and court cases. He has received numerous awards for his teaching and research.

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