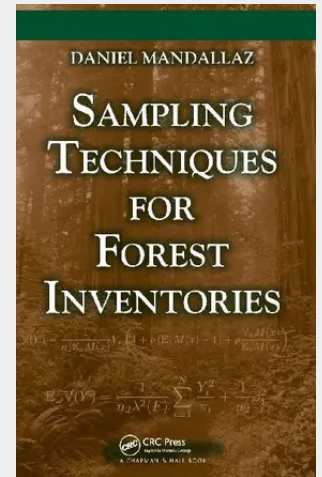


Sampling Techniques for Forest Inventories

Sound forest management planning requires cost-efficient approaches to optimally utilize given resources. Emphasizing the mathematical and statistical features of forest sampling to assess classical dendrometrical quantities, Sampling Techniques for Forest Inventories presents the statistical concepts and tools needed to conduct a modern forest inventory. The book first examines design-based survey sampling and inference for finite populations, covering inclusion probabilities and the Horvitz–Thompson estimator, followed by more advanced topics, including three-stage element sampling and the model-assisted estimation procedure. The author then develops the infinite population model/Monte Carlo approach for both simple and complex sampling schemes. He also uses a case study to reveal a variety of estimation procedures, relies on anticipated variance to tackle optimal design for forest inventories, and validates the resulting optimal schemes with data from the Swiss National Forest Inventory. The last chapters outline facts pertaining to the estimation of growth and introduce transect sampling based on the stereological approach. Containing many recent developments available for the first time in book form, this concise and up-to-date work provides the necessary theoretical and practical foundation to analyze and design forest inventories.

Emphasizing sound theoretical foundations, this book presents the essential concepts and tools required in finite populations, and systematically develops the Monte Carlo approach in infinite populations to analyze or design complex forest inventories. It thoroughly discusses design-based, model-assisted, and model-dependent inference as well as the design of optimal sampling schemes based on the anticipated variance, the g-weight technique, small area estimation, contingency tables, and transect sampling. The book contains roughly 30 problems with complete solutions as well as case studies and simulations that illustrate the various techniques.



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