Calculation Methods for Wallenius' Noncentral Hypergeometric Distribution

Two different probability distributions are both known in the literature as "the" noncentral hypergeometric distribution. Wallenius' noncentral hypergeometric distribution can be described by an urn model without replacement with bias. Fisher's noncentral hypergeometric distribution is the conditional distribution of independent binomial variates given their sum. No reliable calculation method for Wallenius' noncentral hypergeometric distribution has hitherto been described in the literature. Several new methods for calculating probabilities from Wallenius' noncentral hypergeometric distribution are derived. Range of applicability, numerical problems, and efficiency are discussed for each method. Approximations to the mean and variance are also discussed. This distribution has important applications in models of biased sampling and in models of evolutionary systems.

General information
Publication status: Published
Organisations: Center for Bachelor of Engineering Studies
Contributors: Fog, A.
Pages: 258-273
Publication date: 2008
Peer-reviewed: Yes

Publication information
Journal: Communications in Statistics: Simulation and Computation
Volume: 37
Issue number: 2
ISSN (Print): 0361-0918
Ratings:
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.377 SNIP 0
Web of Science (2008): Indexed yes
Original language: English
Keywords: Biased sampling, Natural selection, Wallenius noncentral hypergeometric distribution
DOI: 10.1080/03610910701790269
Research output: Contribution to journal › Journal article – Annual report year: 2008 › Research › peer-review