

GENERATING MULTIVARIATE DISTRIBUTIONS FOR STATISTICAL APPLICATIONS

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RESEARCH SUMMARY

Methods for generating random vectors from multivariate distributions are required in a variety of statistical research contexts. Examples of topics include examination of the robustness of multivariate tests such as Roy's largest root test, assessment of error rates in discriminant analysis, and comparing multivariate goodness-of-fit methods. Although considerable material is available, the pertinent work is scattered in various journals, technical reports and proceedings papers. This presentation assimilates the material in a coherent framework and identifies some useful generation algorithms. The slant is admittedly to statistical applications but this does not preclude its use in other areas.

A forthcoming monograph (Johnson, 1984) and to a lesser extent a University of Arizona technical report (Johnson, Wang and Ramberg, 1983) provide a detailed discussion of the topic of the presentation. The distributions to be considered include the following: Morgenstern, Plackett, Gumbel, Ali-Mikhail-Haq, normal, Johnson's translation system, contaminated normal, elliptically contoured (Pearson Types II and VII), Burr-Pareto-logistic family, and Khintchine's distributions. Bivariate cases of these distributions are illustrated with contour and three dimensional plots of the density functions.

REFERENCES

- Johnson ME (1984), Multivariate Distributions for Statistical Monte Carlo Studies (in preparation).
- Johnson ME, Wang C, Ramberg JS (1983), Generation of Continuous Multivariate Distributions for Statistical Applications, Technical Report No. 83-004, Systems and Industrial Engineering Department, University of Arizona, Tucson, AZ, February, 19 pp.