Concepts in Geostatistics

Edited by Richard B. McCammon
Springer-Verlag, New York,
168 p. 1975.
$12.00 (paperback)

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This is an outgrowth of a short course for geology professors. Chapter 1 begins with an excellent discussion on the statistical behaviours of sample mean and variance when sample size is not fixed in advance but could be determined during the course of experiment by criteria depending on the observations as they occur. The sum of two independent random variables with uniform densities on the interval 0 to 1 has the triangular density. This concept, rather unusual, should be kept in mind when one deals with multivariate analysis. Spatial probability of a dyke and particle size distribution within a thin section are discussed in the light of geometric probability.

Chapter 2 describes the concepts of R- and Q-mode factor analysis used in geology. It presents a detailed numerical procedure and its meaning for each computation step. There is a problem in estimating the factor model (2.4.10); the notion of principal component can be used, and there is a maximum likelihood solution. The concepts of principal component and factor models should not be blurred, even though the principal component solution is adapted. The problem of the determination of the number of factors fit to the model is ignored by using special data sets. The factor model (2.4.10) does not have the resemblance to a classical regression model (Kendall and Stuart, 1966, p. 306). The F's are random variables rather than fixed quantities as regressors. Statistical assumptions required are not discussed.

In Chapter 3, the effect of a moving average on residual variation has not been discussed. It is not made clear under what kind of situations a moving average could appropriately be applied. In practical aspect, we may question whether it is safe to eliminate the trends by a moving average. One example states that minor fluctuations are completely removed (p. 77) by using Spencer's 21-term formula. Kendall and Stuart (1966, p. 375) have demonstrated that the formula does not give the expected result.

Chapter 4 gives an excellent introductory treatment on Markov process. If the underlying random variables that generate the process are not geometrically or exponentially distributed, the process cannot be dealt with directly as a Markov process. It suggests that instead of considering the process at the full set of time points, one considers the behaviour at a suitably select sub-set of time points, so chosen that the resulting process is an embedded Markov process.

Chapter 5 describes simple ratio correlation of two ratios. It states that if the denominators of the ratios are constant, then the ratio correlation will be as usual. On the other hand, if the denominators are random variables, then the ratios behave quite differently.

Chapter 6 gives a brief historical review of statistical and computer applications in university environments. It raises a question - what kind of mathematical technique will be developed in 1980s? The explanation regarding the difference between equation (2.4.4) and the sample variance S_3^2 of p. 2 also raises a question - when would be an appropriate time to present the formal concept as follows: equation (2.4.4) is a maximum likelihood estimator, whereas S_3^2 is an unbiased estimator for random samples from infinite population?

The final chapter presents a problem set in geostatistics suitable for classroom use. Typographical errors occur on p. 9, 10, 25, 26, 30, 33, 49 and 158.

Geostatistics is a fascinating subject, yet frustrating. This book will be of value to mathematical statistics students wishing to learn the problems and limitations of statistics applied to geologic problems.

Reference

Kendall, M. G. and A. Stuart, 1966, The Advanced Theory of Statistics: Charles Griffin and Co. Ltd., London, v. 3, 552 p.

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100 Ways to Save Energy and Money in the Home

Office of Energy Conservation
Energy, Mines and Resources
Information Canada, 159 p., 1975.
Free.

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The Department of Energy, Mines and Resources has managed to come up with an even hundred suggestions to justify the title of its generally useful (and free) publication. That the task must have been a strain is evident, in that the actual number of sensible suggestions is somewhat less. Those likely to be implemented by the average energy-conscious thrifty Joe or Jane are fewer still. As a result, whether intentionally or no, *100 Ways* is entertaining as well as useful.

More than half the book deals with home heating, insulation, and ventilation: how to get more out of a heating system, to add insulation to an older home, to choose an air conditioner (if you must have one). Heating is the largest item in the household energy budget, and savings from good furnace maintenance and added insulation can go as high as 30 per cent of your present fuel bill, even before the thermostat is turned down to 68°F. Drawings, charts and how-to instructions seem clear. After furnaces come hot-water tanks, the second most expensive consumer of energy. The government does not suggest that you take a bath with a friend. Instead it suggests that you take no baths at all - showers are more economical than baths. There are instructions for insulating your tank and hot-water pipes, and a helpful section with diagram on repairing a leaky faucet.

Most of the remaining suggestions expand the oft-repeated idea that "every little bit helps". Fluorescent lights are more efficient than incandescent, electric kettles and frypans more efficient than the stove, solid state TV more economical than tube. Every housewife should own a pressure cooker. Electric razor owners are using less hot water and therefore less electricity than those who lather up. A dimmer switch in the dining room